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STEEL

The Magazine of Metalworking and Metalproducing

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Holding size ... and shape!

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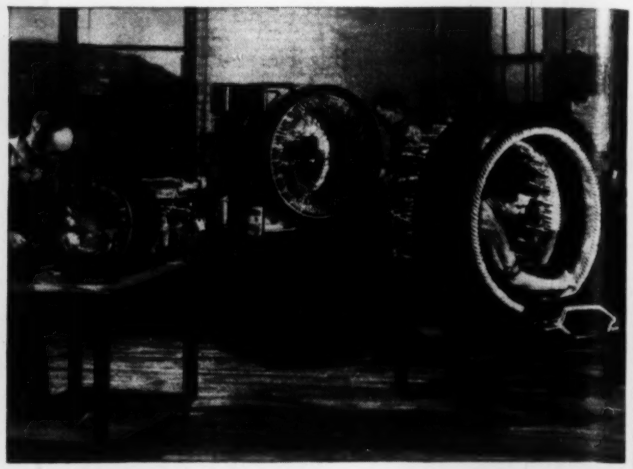

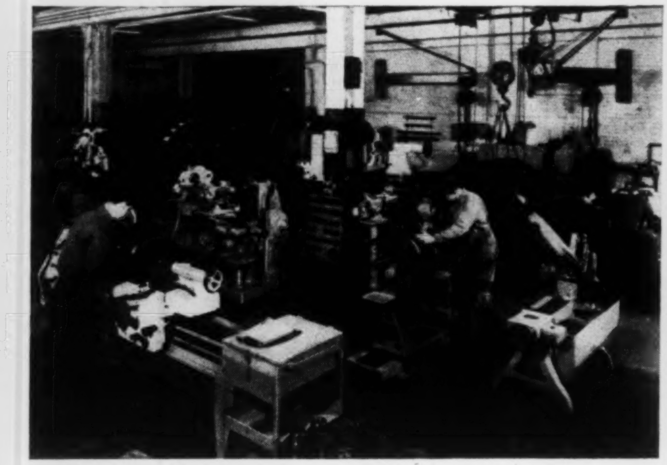

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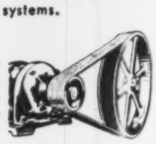

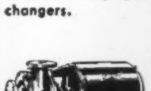

PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

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NEW Highflex air hose developed by B. F. Goodrich is half the weight of ordinary air hose, many times more flexible and easy to use in tight corners. And with this weight saving, Highflex hose actually gives you *higher* burst strength than heavy old-type hose of the same i. d. For the hard-to-get-at job where lightness and flexibility are so important, Highflex gives you —

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Air Hose
BY
B.F. Goodrich

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Galvanite*, a top quality zinc coated steel produced by the Sharon Steel Corporation, Sharon, Pa., has been steadily gaining in popularity where light weight weather-resistant products are fabricated.

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Note the severity of the draw and reverse on the ceiling light fixture pictured. The part was drawn more than four inches then reversed approximately an inch and a half. It is worked of .018 gauge Galvanite.

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By employing Galvanite* fabrication can be speeded, because the operation of coating after fabrication is eliminated. Scrap loss is cut to a minimum, because the tight zinc-steel bond allows severe fabrication without cracking, peeling or scarring. The tight bond also assures against die clogging.

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Behind the Scenes . . .

More Tips for "Salesmen"

The sales manual for "salesmen" that we ran Feb. 20 has brought in other suggestions for the improvement of the profession. One, submitted by George A. Maurath Sr., of Maurath Inc., and others, is this: Blow smoke in the prospect's face with your cheap cigar, smelly pipe or cigaret. Puff away furiously while you're trying to make a sale. The client will be so busy trying to keep away from the fumes that he won't notice flaws in the sales argument. Very effective.

We received so many comments on this smoking angle that our spirit of scientific inquiry was aroused. In a spot check among the editors upstairs, we discovered that eight smoke and six don't. Among nine women we interviewed, all but one smoke. Significant, what?

Classified

We like to read classified ads, including those in STEEL. To us, there's drama in the second-last page of this magazine.

Somebody wants to hire a metallurgical engineer "for research development in processing of iron ores." The ad doesn't say anything about travel, but our imagination soars to Labrador, Canada, Venezuela and other foreign ore fields. If we were younger, we might try a fling at that ourselves—and if we were a metallurgical engineer.

We also like to mentally compose our own classifieds. One would be: Wanted: Writer-engineer to write clear instruction sheets for children's toys.

We spent two and a half hours the other evening trying to assemble a farm set for our youngster. The last sentence of the instructions announced: "The average adult can put the set together in thirty minutes." Blast it! We're *at least* average.

On File

Geraldine, a cleaning woman in the building and our night editor, had a blistering note propped in the typewriter the other morning.

"You're missing a bet again. I'm straightening out your files and what do I find? Report on a readership study of the annual issue. When are you going to put it in the column?"

Right now, Geraldine, right now.

A lot of statistics on who reads what came out of that survey, but the most gratifying to the boys upstairs was that 89 per cent of those who got the metalworking yearbook of Jan. 2, 1950, will keep it for reference. One purchasing agent considers the facts and figures section "a fistful of good statistics arranged for ready reference."

While we were upstairs getting the editors' reaction on this, they came up with a letter from K. P. Leckie of Electric Auto-Lite Ltd., Sarnia, Ont., Canada. Mr. Leckie says: "The constant efforts of your editors to improve the style and method of presenting metal facts keeps your magazine fresh and informative."

Puzzle Corner

You ingenious readers came up with several answers to the match puzzle of Mar. 6. You'll remember that the problem was to make a correct equation by moving one match in this arrangement:

IV—III = VII

Here are three possible solutions: IV − III = √I; IV − III = I × I; and IV = III − VII. We like the first one the best. In the second one you have to stretch a point to make the "X" sign without moving more than one match. In the third possible solution, you have to ignore the fact that algebraically III − VII really equal minus IV. For ingenuity we salute J. C. Tennison of Tennison Brothers, S. A. Fronek of Crucible Steel Co. of America and H. W. Poresky of Keystone Lamp Mfg. Corp.

Here's a problem especially for metallurgists, but if you're not a metallurgist don't let that stop you from sending in your answer. Charley Smith, the metallurgist, has a number of cube-shaped specimens. He wants to mark some identification on them and decides to grind some sides and leave others unground. How many cubes can be distinguished by this method?

Shrdlu

(Editorial Index—page 39)

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STEEL

The Magazine of Metalworking and Metalproducing

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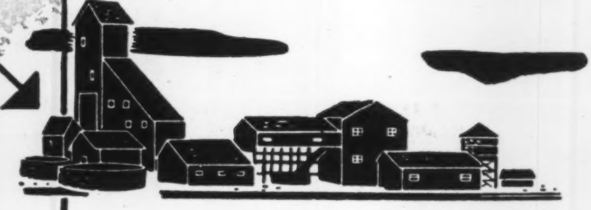

AS THE EDITOR VIEWS THE NEWS

March 20, 1950

Too Weak or Too Strong?

Certain recent happenings have prompted a few commentators to question the sincerity of a number of individuals prominently identified with business and industry. A case in point was the publication of contributions to the Democratic Party war chest, which included sums from some individuals who are known to hold views almost diametrically opposed to those of the party.

Eyebrows are lifted whenever a large Reconstruction Finance Corp. loan goes to a company whose officials have seemed to have "played ball" with the administration currently in power at Washington.

A few weeks ago in this page an effort was made to call attention to the demoralizing effect upon employees of the present automatic system of deducting income taxes from paychecks. It was stated that the practice gives the employee "an erroneous idea of his earning power, of the amount his employer pays him and of the amount the government takes from him in taxes. The automatic mandatory features of withholding deprive him of the valuable experience of handling his own income and outgo according to his own wishes."

Many readers commented on this editorial. All but one, while agreeing with the editorial "in principle," seemed to be willing to condone withholding on the grounds that it collects taxes, a large proportion of which would not be collected if withholding were abandoned. If this revenue from wage earners was lost, corporations would have to make up for the loss. Ergo, withholding saves industry money. Thus ran their reasoning.

In all three of these illustrations—party contributions, RFC loans and attitude toward withholding—one sees a common human trait. It is the disposition to sacrifice principle for expediency.

Where are we to place the responsibility for this lamentable situation? Is human nature too weak or is our central government too strong?

These questions cannot be answered easily. Human nature doesn't change over the years unless it is subjected to powerful external influences. However, our government in Washington has grown by leaps and bounds to the point where it is master instead of servant of the people.

We must cut it down to size before its ever expanding influence succeeds in completely corrupting the morals of the individual. Remember the fall of Rome!

* * *

NO. 1 PROBLEM IS TAXES: George E. Stringfellow, vice president and division manager of Thomas A. Edison Inc., has hit upon an effective way of emphasizing the rapid increase in federal taxes. He points out that in 1930—only 20 years ago—the total cost of the federal government equaled about two-thirds of the total income of the citizens of the state of California. Today the cost of federal government is equal to the total income of the citizens of every state west of the Mississippi except Louisiana, Arkansas, Missouri, Iowa and 11 per cent of Minnesota.

Another way to appreciate the terrific increase in the tax burden is to compare the taxes in relation to a commodity. According to the annual report of United States Steel Corp. for 1949, released last Thursday, the tax paid per ton of steel products shipped was 27 cents in 1902, 87 cents in 1909, $6.07 in 1919, $3.27 in 1929, $4.47 in 1939 and $10.01 in 1949. In the 47 years of the corporation's existence, taxes

(OVER)

have increased by nearly forty-fold.

A disturbing aspect of the present tax outlook is that there is little hope for a marked reduction soon. Following World War I, taxes per ton of steel declined each year for an extended period. In 1946, one year after World War II, taxes per ton were $4.57. Instead of receding from that figure, they had mounted by 1949 to a new high of $10.01.

Curbing excessive government spending clearly is the No. 1 problem of the country.

—pp. 54, 67

* * *

LARGE FUTURE MARKET: Under the government's slum clearance program, capital grant reservations amounting to $77,748,650 for 49 cities have been approved. However, these reservations will not be translated in actual grants until the cities have prepared specific slum clearance programs. In some instances four or five years may elapse before present plans materialize into brick and mortar.

Chicago is off to an early start. It is clearing 100 acres on which New York Life Insurance Co. will build 1400 dwelling units. Philadelphia, Providence, St. Louis, Detroit, San Francisco and Los Angeles have plans in advanced stages. Ultimately this program could provide a multi-billion dollar market for material, equipment and furnishings which go into modern dwelling units. It would be well to keep an eye on it. —p. 57

* * *

HANDS ACROSS THE SEA: Recently there has been a revival of interest among some American manufacturers in establishing branch plants in foreign countries. One idea is to set up manufacturing of American products in foreign plants under licensing arrangements. An alternative is for the American manufacturer to ship parts of his product to the foreign plant and there to assemble these parts, along with some other components produced locally.

Belgian industrialists are exploring possibilities along these lines. Many United States automobile builders are assembling cars in Belgium, using tires, batteries, glass, upholstery and other items obtained locally. The Belgians are wondering whether a similar idea could be worked out for the assembly of certain American household appliances. Belgium is attractive for this type of operation because trade controls and restrictions are less onerous than in many other countries.

Conversely, there are moves on foot to import foreign made components to be assembled into products made in the United States for domestic consumption. —p. 58

* * *

THREE REPLACE EIGHT: For years conventional leaf springs for automobiles and trucks consisted of eight leaves of uniform width of 2 inches. In seeking ways to reduce the cost of this important item, a spring manufacturer discovered that by using leaves that are wider in the middle than at the ends and also thinner at the ends than in the middle, they can produce a three-leaf spring which has a number of distinct advantages over the conventional eight-leaf spring.

Obviously the tapering idea, which makes the spring conform more nearly to a beam of uniform section in its stress-strain pattern, involves precision taper rolling techniques to reduce standard bars of spring steel to the varying widths and thicknesses. However, the result is a weight saving of up to 25 per cent, an estimated 15 per cent higher fatigue life and a marked saving of labor in fabrication and assembly. Also, tapering the ends down to the standard 2-inch width permits the use of conventional fittings. —p. 80

* * *

TOOLING IS IMPORTANT: More and more it is becoming apparent that the efficient use of modern machine tools in satisfying today's demands for low-cost production calls for extraordinary attention to proper tooling. This is particularly true of the devices which hold the work and the tools.

There was a time when a demonstrator could walk into a shop and make a hit by cutting the actual machining time on a certain job by an impressive margin. In those days not too much thought was given as to how long it took to chuck and unchuck the work or to change cutting tools.

Today the thing that counts is the elapsed time from piece to piece. On this basis, sometimes the time involved in loading and unloading the machine is even more important than the time required for actual machining. That is why tooling assumes greater importance under today's conditions. —p. 84

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

FREIGHT— Your rail freight costs may go down May 1 if lower rates proposed by eastern railroads are approved by the ICC (p. 47). Reductions average 25 per cent on selected steel products. The move, aimed at truck competition, will be opposed by trucking associations and perhaps by nonferrous producers. Truckers are planning to boost their rates . . . The House (p. 48) last week passed a compromise version of the O'Mahoney bill to legalize freight absorption. Both the Senate and President Truman are expected to approve it, too.

STEEL INVESTIGATIONS—Two more congressional investigations of the steel industry are getting less public attention than the O'Mahoney committee queries into the steel price boosts, but they may be of as great or greater importance (p. 54). The House Judiciary Committee is investigating U. S. Steel Corp. to see if it has too much economic power. Unlike the O'Mahoney committee, this one has legislative authority. A study by the House Small Business Committee is underway to determine the impact upon small business of the growth of large corporations. Commerce Department has supplied this group with a history of the corporate development of 12 major steel producers.

BUSINESS PROSPECTS—You can get the business if you go after it with aggressiveness, ingenuity and patience (p. 66). That's the consensus on 1950 business prospects contained in many annual reports of metalworking firms. General Motors Corp., in its report, believes the market for new automobiles has been expanded permanently, with a good backlog of demand still existing. GM reports (p. 61) the phenomenal sales volume of $5.7 billion for 1949, 3½ times the 1936-1941 average. But automakers, too, are preparing for more competitive selling. Studebaker Corp. has stripped frills from its Champion, reduced dealer discount and trimmed the price $75 for a model priced in the Chevrolet-Ford-Plymouth class.

COAL PRICES UP—Watch for the outcome in the new phase of the competitive battle between coal and other fuels (p. 49). Soft coal prices are up 2 or 3 per cent, but the operators are absorbing part of their increased costs to regain lost markets. Bituminous consumption by industry in January was down 18.4 per cent from January, 1949, and down 1.9 per cent from December, 1949.

NO CONTRACT—A jurisdictional no man's land is developing in plants that have contracts with the left-wing United Electrical Workers (p. 50). The CIO-sponsored IUE is challenging the UE for representation. Elections will determine which union is authorized, but voting will take time and many contracts expire Apr. 1. General Electric Co. and Westinghouse Electric Corp. have refused to extend UE contracts beyond the expiration date.

WATER—Water everywhere? Not anymore. That factor, plus increasingly tough laws to prevent water pollution and cost-saving possibilities through use of the processed fluid, is making industry more water conscious (p. 53). The trend is reflected in higher sales to industry by companies making water-conditioning equipment. Volume is at the rate of about $30 million annually, more than double the 1939 level.

FOREIGN—Marshall Plan nations are bracing themselves for cutbacks in U. S. aid for the third year of the program (p. 58). ECA is asking Congress for $2950 million, but this is almost certain to be pared. Indicative of the economy spirit of some congressmen is the Senate amendment to reduce this figure by $600 million.

HERE AND THERE IN INDUSTRY—Commerce Department plans to form an iron and steel industry advisory committee (p. 48) . . . February steel ingot output, at 6,782,448 tons, declined 14.5 per cent from January (p. 49) . . . Magnesium alloys will soon be widely employed in the primary structure of military planes, predicts an Air Force general (p. 49) . . . Youngstown Sheet & Tube Co. will spend $25 million for improvements and additions this year (p. 51).

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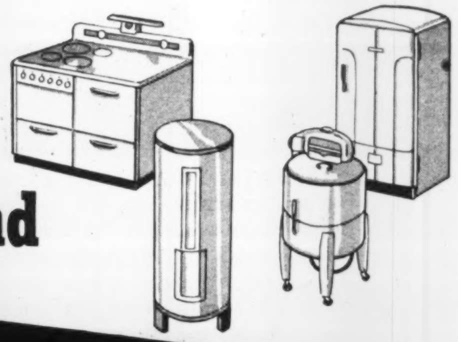

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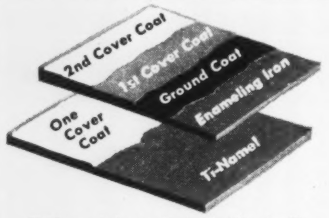

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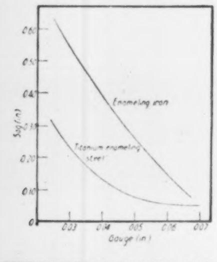

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Railroads To Ask Steel Rate Cut

Propose 25 per cent reductions on selected products, shipped in minimum 40-ton carloads. Truckers, with increase scheduled for May 1, say rail action would be ruinous

YOUR freight charges on steel products shipped by rail may drop sharply May 1.

Eastern railroads expect to file new tariffs providing for an average 25 per cent reduction on selected products in minimum 80,000-pound carloads by Apr. 1. Unless protests to be made by the trucking associations are allowed by the Interstate Commerce Commission, the new rates will become effective 30 days later.

This step is being taken by the railroads to meet truck competition which has been cutting deeply into the railroads' participation in the steel traffic.

Truck Rates To Increase—Trucking associations will fight the proposed rail rate reductions before the ICC. Highway steel truckers are putting into effect new rates on a uniform scale on May 1. These will be about 15 per cent higher than current rates. This is the truck rate increase which originally was scheduled to become effective Mar. 15 (STEEL, Jan. 23, p. 32).

The trucking interests believe the railroads have gone too far in cutting rates on selected items. Motor carriers will not be able to compete with the proposed rail schedule: One spokesman estimates 70 per cent of the highway steel carriers might be forced out of business.

Truck operators believe they may be joined by aluminum producers, brass mills and possibly some steel producers in objecting to the proposed rates.

If their protests are favorably considered by the ICC, the commission may suspend the proposed rail reductions, pending a further investigation. Objectors to the proposal will have until Apr. 20 to voice their protests to the ICC. A final decision by the ICC is probable about Apr. 28.

May Slow Diversion — Steel consumers and producers believe the rate reductions by the railroads are a step in the right direction. But they also believe the rail carriers will have to take further steps if they are to regain a large share of the steel business they have lost to highway carriers.

Although the proposed reductions average about 25 per cent, they range up to 38.9 per cent on short hauls. For many hauls the proposed rail rates are lower than truck rates.

The products on which the reduced rates will apply are those on which competition by the truckers has been most intense.

Double Carload Minimum — The proposed rates will apply only on minimum carloads of 80,000 pounds, which is double the present minimum. Present rates will continue to apply on minimum carloads of 40,000 pounds.

Since the establishment of basic rates of steel freight rates in 1930, there have been four permanent general advances on a percentage basis. These have raised rail rates above those for competitive forms of transportation and have compounded the differentials between the rail charges for longer and shorter hauls. The current rail rate structure is nearly double that prevailing in 1930.

Ton-Mile Loss Heavy—The disruption of competitive relationships resulting from percentage rail rate increases has been an important factor in the downtrend of steel shipped by rail. Shippers have been forced out of the more distant markets and consumers have been forced to find sources of steel supply nearer their plants. This has resulted in a reduction of iron and steel traffic measured in ton-miles, in addition to the losses by the railroads to truckers and water transportation.

How Proposed Freight Cuts May Affect You

FROM:	TO:	Present and Proposed Rates*
Pittsburgh	Philadelphia	54—42
Pittsburgh	New York	62—50
Pittsburgh	Bethlehem	52—40
Buffalo	New York	58—46
Johnstown	New York	54—42
Johnstown	Philadelphia	48—37½
Bethlehem	New York	29—19½
Bethlehem	Philadelphia	20—14
Sparrows Pt.	New York	42—32
Sparrows Pt.	Philadelphia	29—19½
Pittsburgh	Columbus	40—27
Pittsburgh	Cincinnati	51—35
Pittsburgh	Detroit	51—35
Cleveland	Toledo	33—20
Cleveland	Canton	20—13
Youngstown	Akron	19—13
Youngstown	Detroit	43—30
Detroit	Flint	22—15

* Present rates based on minimum 40,000-pound carlots. Proposed rates based on 80,000-pound carlots.

Steel consumers and producers long have argued that present rail rates on iron and steel are not warranted by the transportation characteristics of steel traffic. The average value of steel, they say, is relatively low in comparison with almost all other commodities except the bulk raw materials. Steel moves in heavily loaded cars. Loss and damage claims are insignificant.

Products Involved — The products affected include: Bands; most bars, except reinforcing exceeding 30 feet in length; boiler flues; hoops; pipe 6⅝ inches or less in diameter (15 per cent of pipe shipment can consist of larger sizes); pipe fittings, pipe hangers; plain, lacquered or painted black plate; roofing; most types and sizes of sheets; strip; strapping; most tin or terne plate; boiler tubes; most types of tubing, 6 inches or less in diameter; wire; nails; rods; and steel siding.

Semifinished and export rates are not covered in the current proposal. Both will be considered later. No fabrication-in-transit privileges are allowed on the proposed rates. No allowance, at least temporarily, will be made for shrouding.

Barge Rates Reduced

Reduced rates for shipment of iron and steel products from Chicago to Gulf ports by barge will be put into effect by John I. Hay Co. Apr. 1. The new rate of $8.01 per ton for 500-ton loads and $9.36 per ton for 400-ton loads between Chicago and Corpus Christi, Tex., represents a 13-cent rate reduction, the cut being made to meet competition of the government-owned federal barge lines. An uninsured rate of $4.29 per ton, 500-ton minimum, has been established between the Chicago area and New Orleans. Insured rate is 9 cents a ton higher.

Northbound scrap shipment rate will be substantially reduced. Previously $9.25 a ton from Houston, Galveston, New Orleans and other Texas and Louisiana coastal cities, to Chicago, the new rate is $6.78 a gross ton, 1000-ton minimum, to Chicago, or $7.10 per gross ton, same minimum, to East Chicago, Indiana Harbor, Gary and South Chicago. Reason for this change: Better scrap loading is now possible.

Previously, scrap generated from shipbreaking operations was bulky, and barges were light when loaded. Normal peacetime types of scrap are now being produced in quantity in the

Gulf area with consequent savings in cost of carrying.

Barge Shipments Higher

Barge shipments of manufactured iron and steel products on Illinois waterways have been sharply higher so far this year. Chicago District Corps of Engineers states in the first two months of the year almost half as much material has already been transported as in all of 1949. The more than 97,000 tons of such products moved in barges compares with 195,000 tons last year.

One barge line operator states that the long-term rising trend in barge shipments from the Chicago district to the Gulf has not changed its rate of climb noticeably since abandonment of steel basing point pricing. Steel users in Chicago are taking much more interest in Pittsburgh steel during the current shortage and considerable of this material can be expected to be brought in by water in coming months.

Canadian Roads Ask Rate Hike

Railroads in Canada are taking a different tack from U. S. roads: They want to increase freight rates.

In a surprise move the Railway Association of Canada applied to the Board of Transport Commissioners to boost its Mar. 1 increase by another 3 4/10 per cent. Granting of the application would add about $11 million to the national freight bill.

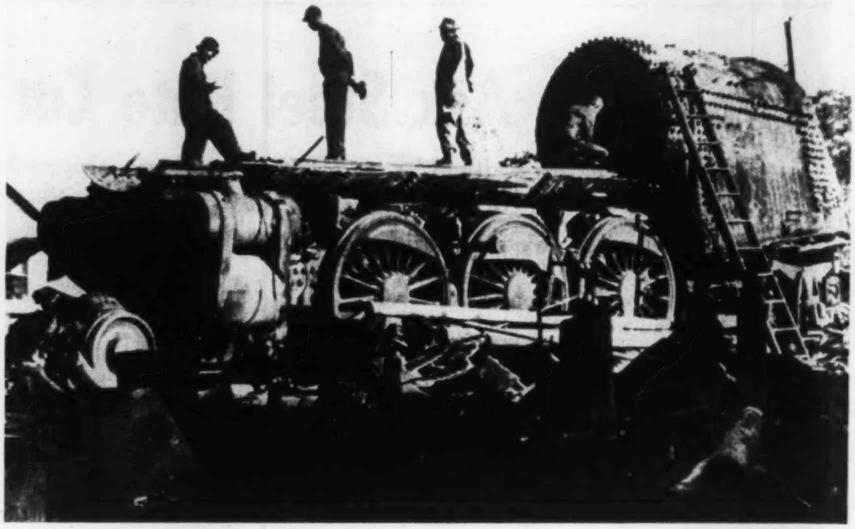
The Mar. 1 award gave the railroads about $26 million a year, boosting existing rates 7 4/10 per cent. Canadian railways had asked for a 20 per cent increase in 1948. They were granted an 8 per cent increase last September and another 8 per cent Mar. 1.

When the award was made, the railways filed new rate schedules taking in the increase, to become effective Mar. 23. Now they're asking for the full 20 per cent.

The action came while most of the provinces opposing rate increases were considering an appeal to the cabinet for downward revision of the Mar. 1 award and after Saskatchewan had decided to launch such an appeal.

Railroad Adds 20 More Diesels

Further steps toward complete dieselization of Chicago, Rock Island & Pacific lines was announced by J. D. Farrington, president. Twenty new diesel locomotives will cost about $2.5 million. Twelve are 1500-hp units; one is a 2250-hp unit, and seven are 800-hp units.



Authenticated

GRAVEYARD SHIFT: Scrapping of this old steam engine is being done to specification by Gulf, Mobile & Ohio railroad, Jackson, Tenn. Old boiler tubes, which have been removed, will be used for irrigation pipe. GM & O is completely retiring its steam engines and replacing them with diesels. Water tanks, coal chutes, cinder pits and other railroad facilities are being outmoded by diesels

House Approves Modified Freight Absorption Bill

FREIGHT absorption to meet competitive delivered prices soon may be declared legal by Congress and the administration. The House last week approved a compromise version of the O'Mahoney freight absorption bill. The Senate is expected to approve. If so, President Truman is likely to sign. Attorney General McGrath and Acting Chairman Mason of the Federal Trade Commission say they will not object to the bill in its present form.

Cuts FTC's Power—The bill as now written would reduce the FTC's authority in the field of pricing. Some government lawyers believe this may work against industry. One attorney told STEEL that "if the bill becomes law it undoubtedly will hasten the coming of utility treatment of our basic industries, including steel."

This lawyer points out that debate on the measure "proves there is a large and vociferous opposition to any relaxation in the government's authority over all factors that enter into the marketing of goods. The resentment aroused over this bill will be followed by persistent efforts to bring about much more positive controls than we have had in the past. And I am afraid industry will be worse off in the long run than if the FTC and the courts had been left free to work out the problems of permissible pricing practices."

"Reasonable Probability"—One of the bill's provisions that has been the subject of much dispute relates to the evidence the government must present to prove illegal collusion. In the current version the government must prove "reasonable probability" of such illegal effect.

This will make it easier for the government to establish a case than under the wording of the original bill. But it will be more difficult for the government to prove illegal action than under Supreme Court rulings which require only proof of "reasonable possibility."

U. S. Agency Plans Steel Group

A home for the iron and steel industry in the government.

That substantially is the intention of a move that the Commerce Department will make shortly. It will appoint an industry advisory committee to "comprise a high-level executive group representative of the industry as regards size, geography and type of product and including integrated and nonintegrated producers."

The decision to form the advisory committee springs largely from suggestions by steel company executives who served on the Iron & Steel Industry Advisory Committee of the Office of Industry Cooperation. The committee was disbanded when OIC went out of business.

Although the committee to be set up will be identified with the Commerce Department, at least six other government agencies and departments have agreed to make use of it.

Soft Coal Prices Up

Operators absorb part of higher costs, pass rest along in average 15-cent increase per ton

MAJOR soft coal producers are absorbing part of their increased labor costs, but are passing the rest along to consumers in a price increase that averages about 15 cents a ton.

The boosts, which range from 10 to 25 cents a ton, will be 2 or 3 per cent of present mine prices, which are from \$5.50 to \$7 a ton. The new coal contract means a direct labor cost increase of about 20 cents a ton. Operators add to this 10 or 15 cents in increased costs resulting from lower production now that coal has lost more markets to oil and natural gas. Total bituminous output this year is expected to be about 425 million tons, compared with 600 million tons in 1948.

Coke Up—A major coke price increase to follow the soft coal hike was made by H. C. Frick Coke Co., subsidiary of U. S. Steel Corp. Connellsville furnace beehive coke is up \$1 to \$14-14.50 a ton. Connellsville foundry beehive is up 50 cents to \$15.50-\$16.50 a ton. Mine prices of anthracite were increased Mar. 16 from 10 to 75 cents a ton by leading producers.

Industry spokesmen predict that soft coal companies with outmoded equipment and low-quality mines may go to the wall in a few months because of the higher costs. A few operators in central and western Pennsylvania plan to cut prices to hold their markets.

Prices Vary—In the high-volatile-coal fields of northern West Virginia and Ohio prices are up about 10 cents a ton. In the high-volatile fields of western Pennsylvania, the average rise is about 15 cents. The rise was 25 cents in the southern high-volatile area.

For the time being, Illinois coal mining companies are leaving prices unchanged. Operators in that area boosted the price of domestic coal 50 cents a ton last December to allow for higher costs resulting from the short work-week.

Big Job: Regain Coal Markets

Coal operators have a job ahead to regain markets.

Bureau of Mines figures show that total bituminous coal consumption by industry in January was down 18.4 per cent from January, 1949, and down 1.9 per cent from December, 1949. Consolidated Edison System says it is now able to purchase oil for power generation at a price nearly one-seventh below the price of coal. The system, which used oil for 6 per cent of its needs in 1946, was using 60 per cent at the end of the coal strike.

This breakdown shows soft coal consumption in thousands of net tons, excluding exports and bunker fuel.

	Jan. 1950	Jan. 1949	% Change
Utilities	7,306	8,251	—11.5
Coke Ovens	7,991	9,635	—17.1
Steel mills	704	878	—19.8
Cement mills	651	733	—11.2
Other Indus.	8,874	10,819	—18.0
Railroads	5,320	7,498	—29.0
Total indus.	30,846	37,814	—18.4
Retail dealer	11,136	9,478	+17.5
Grand Total	41,982	47,291	—11.2

Scrap Man Urges Free Market

A plea for restoration of free and open competitive scrap markets in the best interests of the steel industry, was made by Benjamin Schwartz Co., New York, at a New York chapter meeting of the Institute of Scrap Iron & Steel.

Mr. Schwartz, in discussing the function of the free market, stated that direct dealing and other practices by steel mills have resulted in a new pattern of buying scrap that, if continued, would jeopardize the independent scrap dealer. At the same time, he called for the prompt elimination of unfair trade practices, particularly in connection with the deterioration of scrap quality, by the adoption of a code of standards and the establishment of machinery to enforce such a code.

More Magnesium in Planes

Air force general predicts increased use of the metal because of its great availability

MAGNESIUM alloys will soon be widely employed in the primary structure of a large number of military aircraft. That is the prediction of Brig. Gen. F. R. Dent Jr. who spoke before a Pittsburgh Chapter meeting of American Society for Metals. Aluminum is now the most widely employed metal in the primary structure of military planes.

General Dent is deputy chief, Engineering Division, Air Materiel Command, Wright-Patterson Air Force Base, Dayton, O. He says that the advantage magnesium has over aluminum is greater availability. This country's bauxite ore potential, while not exhausted, has been reduced to lower grade ores that are more difficult and costly to refine. Basic magnesium is taken from sea water and exists in an inexhaustible supply.

Inexperience of Industry—The aircraft industry's lack of experience in handling magnesium has been and still is the greatest drawback to use of the metal. Other problems of duc-

February Ingot Output Slips 14.5 Per Cent

FEBRUARY steel output, at 6,782,448 tons of ingots and steel for castings, declined 14.5 per cent from January, largely because of the coal strike, American Iron & Steel Institute says.

In January, the production was 1,148,000 tons higher at 7,930,372 tons (revised). In February, 1949, the output was 7,480,724 tons. Steelmaking furnaces were operated at 88.9 per cent of capacity in February.

In January they were operated at 93.9 per cent of capacity. In February, 1949, operations were at 101.1 per cent of capacity.

	—Open-hearth—		——Bessemer——		——Electric——		——Total——			
Period	Net Tons	% Capac.	Net Tons	% Capac.	Net Tons	% Capac.	Net Tons	% Capac.	Calculated Net Tons Weekly	No. weeks in mo.
1950										
*Jan.	7,131,519	96.5	379,252	80.6	419,601	71.9	7,930,372	93.9	1,790,152	4.43
†Feb.	6,135,099	91.9	255,565	60.2	391,784	74.3	6,782,448	88.9	1,695,612	4.00
1949										
Jan.	7,287,683	101.1	408,552	92.6	487,260	93.8	8,183,495	100.2	1,847,290	4.43
Feb.	6,633,779	102.0	379,698	95.3	467,247	99.6	7,480.724	101.4	1,870,181	4.00
Mar.	7,473,901	103.7	430,176	97.5	483,850	93.2	8,387,927	102.7	1,893,437	4.43
1st qtr.	21,395,363	102.3	1,218,426	95.2	1,438,357	95.4	24,052,146	101.5	1,870,307	12.86
Apr.	7,015,611	100.5	404.095	94.6	365 570	72.7	7,785,276	98.4	1,814,750	4.29
May	6,889,230	95.6	400,741	90.9	299,751	57.7	7,589,722	92.9	1,713,256	4.43
June	5,954,619	85.3	349,196	81.8	194,386	38.6	6,498,201	82.2	1,514,732	4.29
2nd qtr.	19,859,460	93.8	1,154,032	89.1	859,707	56.4	21,873,199	91.2	1,681,260	13.01
July	5,307,471	73.8	300,236	68.2	171,415	33.1	5,779,122	70.9	1,307,494	4.42
Aug.	6,101,499	84.7	355,335	80.6	257,910	49.7	6,714,744	82.2	1,515,744	4.43
Sept.	5,992,306	86.1	350,282	82.2	247,601	49.3	6,590,189	83.5	1,539,764	4.28
3rd qtr.	17,401,276	81.5	1,005,853	76.9	676,926	44.0	19,084,055	78.8	1,453,470	13.13
Oct.	814,374	11.3	......	...	111,059	21.4	925 433	11.3	208,901	4 43
Nov.	3,805,730	54.5	172,270	40.3	238.262	47.4	4.216,262	53.3	982,812	4.29
*Dec.	6,951,572	96.7	396,075	90.0	369,611	71.3	7,717,258	94.7	1,745,986	4.42
*4th qtr.	11,571,676	54.1	568,345	43.4	718,932	46.7	12,858,953	53.1	978,611	13.14
*Total	70,227,775	82.8	3,946,656	76.0	3,693,922	60.4	77,868,353	81.0	1,493,448	52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,668 287 net tons open-hearth, 106,195 net tons bessemer and 131,786 net tons electric ingots and steel for castings, total 1,906,268 net tons; based on annual capacities as of January 1, 1950 as follows: Open-hearth 86,984,490 net tons, bessemer 5,537,000 net tons, electric 6,871,310 net tons, total 99,392.800 net tons. 1949 annual capacity was 96,120,930 net tons.

* Revised. † Preliminary figures, subject to revision.

tility, corrosion resistance and fabrication technique in use of magnesium have been solved.

General Dent also believes that titanium has a great future in military aircraft. Commercially pure titanium is light, strong, ductile and corrosion resistant. Known reserves of the ore on the North American continent are high. Its lightness and corrosion-resistance characteristics may make it ideal for portions of aircraft structure immediately surrounding jet engines, tailpipes and afterburner installations. Stainless steel now is commonly used in these parts of the structure.

Martin Gets Big Order

Orders for a total of 65 commercial transport planes valued at $35 million boost Glenn L. Martin Co.'s backlog to more than $105 million. TWA ordered 30 planes and Eastern Air Lines 35. The model ordered by both air lines is a twin-engined, 40-passenger type.

AMHS Organizes N. Y. Chapter

A New York chapter of American Materials Handling Society was organized at a meeting of more than 100 members. It is the twelfth chapter of the national society; there are more than 2000 members in the AMHS national organization.

Temporary officers of the New York chapter are: Chairman, H. C. Bishoff, American Can Co.; vice chairman, A. A. Burkhardt, New York Central System; treasurer, B. W. Hupp, Drake, Startzman, Sheahan, Barclay Inc.; and secretary, F. D. McCann, Hartner Electric Co.

Westinghouse Slates Forum

The 1950 Westinghouse Machine Tool Electrification Forum will be held in Buffalo, Apr. 25-26. The first day's sessions will be held at the Hotel Statler; the second day's program will be presented at the Buffalo plant of Westinghouse Electric Corp.

Machine Tool Program Set

Evaluation of cutting tools will be featured in the second machine tool familiarization training program scheduled for Apr. 26-May 5 at Rochester Institute of Technology, Rochester, N. Y.

Tuition, which includes all course materials and a special dinner meeting for participants, will be $100. Inquiries should be addressed to Alfred L. Davis, associate director, Evening & Extension Division, RIT, Rochester 8.

SAFE WAY IS BEST WAY: Time was when two men handling scrap for baling in the Metals Stamping department, Feeder Division, Westinghouse Electric Corp., lost a lot of time being treated for minor lacerations from physical contact with sharp steel sheets. Under a new setup at East Pittsburgh the two scrap handlers are no longer necessary. The man who runs the baler now charges the scrap metal with a magnetic crane. Time needed to load the baler was reduced to one-quarter, and the hazardous operations are virtually eliminated. Compressed bales are conveyed up a ramp to a waiting freight car

Left-Wing UE Faces No-Contract Period

THE JURISDICTIONAL no man's land caused by the battle between the UE and IUE unions widened last week as General Electric Co. rejected a new UE demand to extend its contracts with that left-wing group beyond their Apr. 1 expiration date. Contracts cover 100,000 GE workers.

The CIO-expelled United Electrical, Radio & Machine Workers of America and the recently formed International Union of Electrical, Radio & Machine Workers of America-CIO are struggling for representation in GE plants. An election to pick the winner will be held soon under the auspices of the National Labor Relations Board, but GE believes that a vote before Apr. 1 is impossible.

To Continue Benefits—GE promises that it will "voluntarily" continue the benefits given the workers under the expiring contracts. The company reiterates its "neutrality" policy in the inter-union fight, and says its decision not to renew the UE contracts while the dispute is pending is in line with precedent for companies in such a position. The company first told the UE on Dec. 28 that it would not renew the contracts for that reason, but the union is still pressing GE to reverse its stand.

Westinghouse Electric Corp. says that it, too, will not extend UE contracts covering 75,000 workers after Apr. 1. In a third major UE-IUE battleground, at five electric manufacturing plants of General Motors Corp., the CIO union won an 8½ to 1 victory. The IUE is expected to win the elections in most of the larger plants. The UE may make a better showing in smaller companies, where it may have stronger local organization.

American Can Gives Wage Hike

American Can Co. and United Steelworkers of America-CIO have signed a two-year contract that provides for a five-cent-an-hour wage increase and $100-a-month pensions.

United Steelworkers represent about 15,000 in 28 of American Can's 60 operating units in the U. S., Canada and Hawaii. Total employment is 30,000. The contract became effective Mar. 16.

A joint announcement by company and union officials says the contract "incorporates administrative details of a company-financed pension plan which was agreed upon in Cincinnati last Sept. 30."

The new contract also includes adjustment of job rates and shift premiums and a streamlined system for handling grievances. The present average wage is $1.40 an hour.

Spending $25 Million

Sheet & Tube will use that much of $33 million earmarked for expansion and improvement

EXPENDITURE of $25 million for improvements and additions to Youngstown Sheet & Tube Co. is scheduled for this year. This sum is part of the $33 million worth of improvements and additions for which appropriations were made in 1948, 1949 and January, 1950, but which remained unfinished.

The $33 million figure includes purchase and equipping of new coal properties in Pennsylvania and the sinking of a new shaft at a Michigan iron ore mine.

Principal other uncompleted but authorized improvements include:

At Campbell, O., Works—Improvements and additions to seamless and buttweld pipe facilities; diesel locomotive cranes to replace old steam operated equipment; replacing worn out ammonium sulphate producing equipment at the coke plant; new shear line for hot strip department; rebuilding of blooming mill for producing wider and longer slabs to meet demands of buyers of hot and cold-rolled sheets; additional equipment for pipe coupling shop; and improvements and replacements in cold-rolled sheet facilities.

At Brier Hill Works, Youngstown—Electric-weld pipemaking facilities will be enlarged and improved so the range of high test pipe offered to the trade can be widened. Also scheduled for the Brier Hill Works are equipment replacements at the coke plant.

At Indiana Harbor Works, East Chicago, Ind.—Improvements and additions will be made to the tin mill unit and to the tube mill; a new unit will be built to produce electrical conduit; 21-inch mill will be revamped to roll skelp in coils for the new continuous buttweld mill under construction; revetments will be constructed to protect and expand the company's property along lake and canal banks.

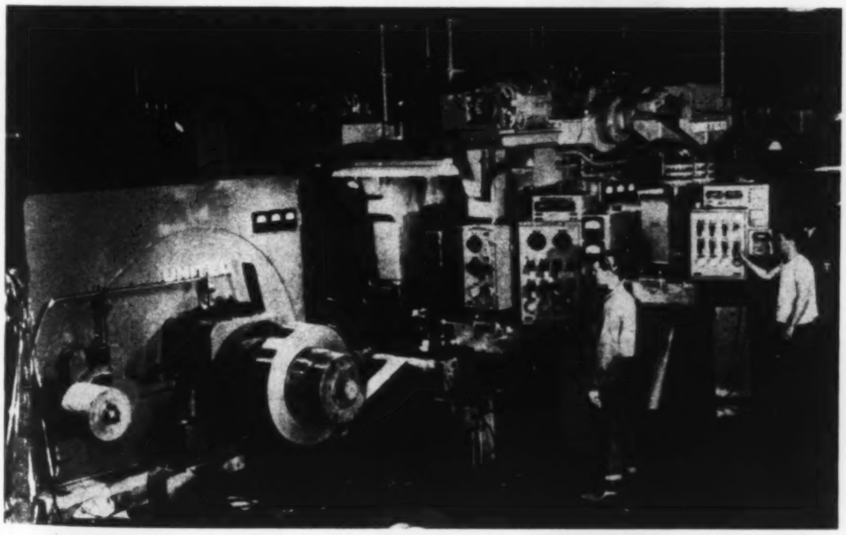
Sheet & Tube last year dismantled or retired properties costing $1,719,178, and spent $14,501,947 on plants, additions, betterments and improvements.

U. S. Pipe Plans Plant

United States Pipe & Foundry Co., Burlington, N. J., expects to start construction this year of a plant near Richmond, Calif., for production of cast iron pressure pipe.

Plans have been drawn, estimates made, and $2.5 million authorized for buildings and equipment necessary for this new facility. As a site for the new plant the company acquired 35 acres near Richmond in late 1948.

In the last four years the company has spent $7,356,000 for modernizing foundry equipment, machine tools and other facilities. This expenditure has been financed entirely from earnings retained in the business.



40 PER CENT REDUCTION IN ONE PASS: Wallingford Steel Co., Wallingford, Conn., added a new two-stand, four-high tandem mill manufactured by United Engineering & Foundry Co., Pittsburgh. Used in the breakdown of stainless and carbon steel, it is said to reduce strip gage by as much as 40 per cent in a single pass. The mill is, in effect, really two mills; combined in tandem and operating on strip from the same payoff. Each unit has two backup rolls and two work or polish rolls. The mill can handle 18-inch stainless and 22-inch carbon strip from .16 to .010 inches at speeds up to 800 feet per minute

Laclede Plans New Terminal

Because water transportation has materially helped Laclede Steel Co., St. Louis, strengthen its competitive position the company is leasing river front property above the dam at Alton, Ill., so it can operate its own rail-water terminal.

In another move to strengthen its position the company is leasing a warehouse on the Intracoastal Canal in New Orleans. There it will fabricate reinforcing steel and warehouse building products for the locality.

Illustrating changes in the company's business in the last 20 years, 55 per cent of its shipments in 1949, representing $19,271,670 of sales, came from products it did not produce in 1929.

Sloss-Sheffield To Modernize

Sloss-Sheffield Steel & Iron Co., Birmingham, estimates it will spend several millions of dollars in the next two to three years to continue modernization of its plants.

Next major project in its rehabilitation program will be installation of two modern steam generators at blast furnaces Nos. 3 and 4 to replace obsolete steam boilers. Estimated cost of this work is $750,000.

All expenditures for modernization in recent years have been made from company funds and it hopes that the entire program can be financed from earnings rather than by borrowing money.

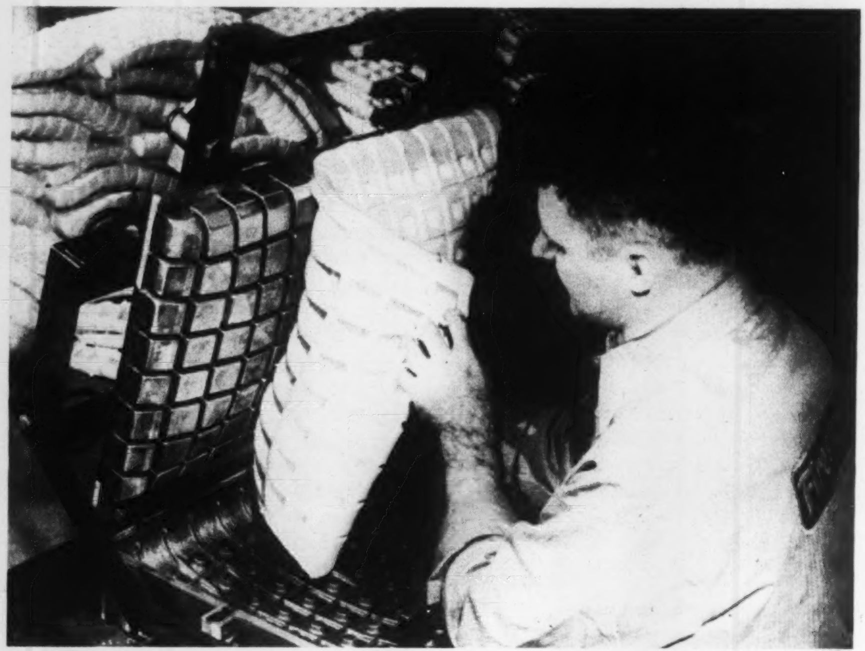
Kane Begins Pipe Production

Limited production has begun on large-diameter steel pipe at the new mill of Kane Boiler Works at Galveston, Tex. The installation will soon be producing big-inch line pipe, up to 30 inches OD in size. The mill is designed to manufacture welded steel pipe in sizes ranging from 12¾-inch to 36-inch OD in 40-foot lengths. The plant has a production capacity of over 10,000 tons per month.

Gibson Electric Expands

Gibson Electric Co., Pittsburgh, has increased the production capacity of its powder metallurgy department by 50 per cent.

The increased capacity results from installation of a sintering furnace, a brazing furnace, a hydraulic press for compressing powdered metals, an automatic powder weighing



NEA

FOAMED LATEX: At Firestone Tire & Rubber Co.'s plant in Fall River, Mass., production facilities for foamed latex—used by automobile and furniture manufacturers—was quadrupled. Installation of continuous production line utilizing electronic curing and quality control devices helped in the tremendous expansion which Firestone calls "the most significant development of the year in the rubber industry"

machine and other processing equipment. In addition to electrical contacts made from metal powder, Gibson also makes contacts from fine silver, coin silver and silver alloys.

Kaiser Aluminum Output Up

Kaiser Aluminum & Chemical Corp., Oakland, Calif., is stepping up production of its Pacific Northwest plants to capacity to fill rush orders from fabricators of grain storage bins. The company says the orders amount to several million pounds.

Lone Star Sells Its Coal Tar

Reilly Tar & Chemical Co., Indianapolis, has contracted with Lone Star Steel Co. to take the entire coal tar products of the Lone Star, Tex., plant. The Indianapolis firm will build a $500,000 processing plant near Lone Star for manufacture of a wide range of chemicals. Reilly has 15 other chemical plants.

The proposed operation will produce exclusively for the Southwestern market. The Lone Star-Reilly agreement provides that the steel company shares in the profits of the chemical plant.

Curtis Changes Sales Policy

Curtis Universal Joint Co., Springfield, Mass., is changing its sales policy.

A shift from jobber representation to a direct sales program should save 5 to 20 per cent in cost for users of Curtis joints, the company says. Any user or designer can use Curtis' engineering service by sending to Springfield prints of installation, together with torque speed, load and angle of operation.

More Engines from Continental

Engine production by Continental Motors Corp. and its subsidiaries will be about 41,500 in March, compared with 24,896 in February and 30,212 in March, 1949. C. J. Reese, president, points out this is the third successive monthly increase for the Muskegon, Mich., firm. All company divisions will share in the gain from last month and a year ago.

New Taconite Separator Built

An improved type magnetic separator, to aid in concentrating low grade iron ore from Minnesota's Mesabi range, has been developed by Jeffrey Mfg. Co., Columbus, O., with magnetic design assistance from Westinghouse Electric Corp.

The system is already at work in the Aurora, Minn., plant of Erie Mining Co. The ore nodules produced contain about 64 per cent iron, which is several per cent higher than the high-grade ores now used in blast furnaces. Economies in shipping and in blast furnace operations made possible by this richer ore are expected to offset the added cost of extracting the iron mineral from the taconite. These ore nodules already are being produced at Aurora at the rate of 200,000 tons a year.

The new separator, operating on a somewhat different magnetic principle than previous devices of its type, consists of a rotating drum mounted in a pulp box of special design. Stationary magnets inside the drum provide the means whereby iron ore is extracted from the taconite.

As the mixture passes beneath the separator's rotating stainless steel drum, the magnets draw the magnetic iron ore from the mixture to the drum. The movement of the drum carries the ore through a washing zone and then away from the direct pull of the magnets, depositing it in a trough leading to further grinding stages.

Power Equipment Needed

Westinghouse official sees high demand for generating apparatus for next three years

CONTINUED heavy demand is foreseen for power generating equipment for at least the next three years.

John K. Hodnette, vice president of Westinghouse Electric Corp., on a visit to San Francisco, predicted the U. S. electric power industry will install 6 million kilowatts of added capacity in both 1950 and 1951, and possibly the same amount in 1952. During 1949 the utility industry added 6,750,000 kilowatts to capacity, bringing the total for the country above 6 billion kilowatt hours.

Private Business Large—Mr. Hodnette estimates that about one-fourth of the new business in prospect will come from federal and municipal power projects and the remainder from private utilities.

Business prospects in general for 1950 are viewed favorably by the Westinghouse official. Mr. Hodnette reports that industrial electrical volume has leveled out at a high rate. He says that prices are continuing to firm as a result of steel price increases and a continued upturn in the cost of labor.

Operations of Westinghouse's plant at Sunnyvale, Calif., are picking up, according to Robert Neal, vice president and general manager of western operations. Employment at the plant after dropping last year from 2200 to 1600 is beginning to build up again.

Water Conditioning Equipment Need Grows

Metalworking industry is finding that water takes more and more processing. Conditioning equipment sales double in ten years. Government contributes to water consciousness

IT IS getting so that water requires as much processing as good bourbon.

The metalworking industry is discovering that trend as national water supplies dwindle, laws to prevent stream pollution become more common and cost-saving possibilities in use of water for industrial purposes become more apparent. The 30-odd companies manufacturing and engineering water conditioning equipment have discovered that fact, too, because their sales to industry, now at about $30 million annually, are more than double what they were in 1939.

Removes Impurities — The water conditioning equipment industry makes automatic and manually controlled apparatus to remove impurities from water. Major applications in industry are for boiler feedwater conditioning and general process water, says Permutit Co., New York. Importance of another application, treatment of industrial sewage, is increasing. The water conditioning industry makes demineralizers, deaerators, filters, chemical feed equipment, precipitation equipment, degasifiers, meters, internal boiler feedwater treatment equipment, gages, hydraulic controls, softeners, sewage treament and other equipment.

Few companies in the industry make all this apparatus. Most operate as engineering service firms. When a company gets a contract, it uses its own equipment and subcontracts for what it does not build itself to solve the problem. Most problems are one-shot affairs; relatively little of the equipment the industry makes can be standardized. Installation costs may range from $200 to $2 million or more.

Water Conservation—Water conditioning equipment does not actually conserve water except where process water can be purified and recycled. But it does help to better use existing supplies—that in most cases are growing steadily poorer in quality. The water shortages in metropolitan New York and southern California have had little direct effect on demand for water conditioning equipment, but these situations will help alert industry to greater water-consciousness. Rain, the primary source of water supplies, is diminishing at the rate of two inches a century in the U. S.

A second factor contributing to greater water consciousness is closer government attention to water pollution. The Federal Water Pollution Control Act of June 30, 1948, was a forerunner of many tougher state and local laws. All plants which discharge directly into rivers or lakes have already been inspected by government for pollution violations or can expect to be inspected in the next year or two.

Costs May Be Cut—E. G. Kominek of Infilco Inc., Chicago, says that pollution laws may help industry to cut costs by forcing it to keep better house and make more economic disposal of what now goes down the sewer. Water conditioning equipment helps cut costs by reducing metal corrosion from impurities in water and by improving the performance of production processes such as plating that use water.

Alan Wood Purifies Water

Alan Wood Steel Co. has just completed a $775,000 water treatment plant to purify waste water from the company's steel mills along the Schuylkill river, under Pennsylvania's stream pollution abatement program.

John T. Whiting, president of Alan Wood, says the installation not only eliminates the discharge of contaminating waste products into the river, but also acts as a water conservation unit. The installation enables the company repeatedly to circulate purified water to the mill supply system.

Antipollution Plans Co-ordinated

Pittsburgh Consolidation Coal Co. is co-ordinating its program to control air and stream pollution. Henry F. Hebley, director of research for Pittsburgh Coal Co. since 1939, has been appointed research consultant to Pittsburgh Consolidation, will co-ordinate the company's activities and will co-operate with government and civic authorities in these fields.

Pollution Men Reappointed

President Truman reappointed for another year the six non-government members of the 11-man Water Pollution Control Advisory Board.

This body, authorized under the Water Pollution Control Act of 1948 to review Public Health Service water pollution control activities and make recommendations to Surgeon General Leonard A. Scheele, has rendered important help in making effective the Health Service's antipollution fight.

NEA

EGG-SHAPED PIPES: Dragline casts earth around double multiple plate culvert at Rock Creek near Keswick Dam on the Shasta Dam branch line railroad relocation. The pipes will rest at the bottom of a fill made to carry rails of the new line that had to be rerouted to bypass Keswick Dam and its reservoir so service to Shasta Dam and the rich Iron Mountain mining area could be continued. When fill is complete, shoring is removed from the inside of the egg-shaped pipes; settling earth returns pipe to original shape

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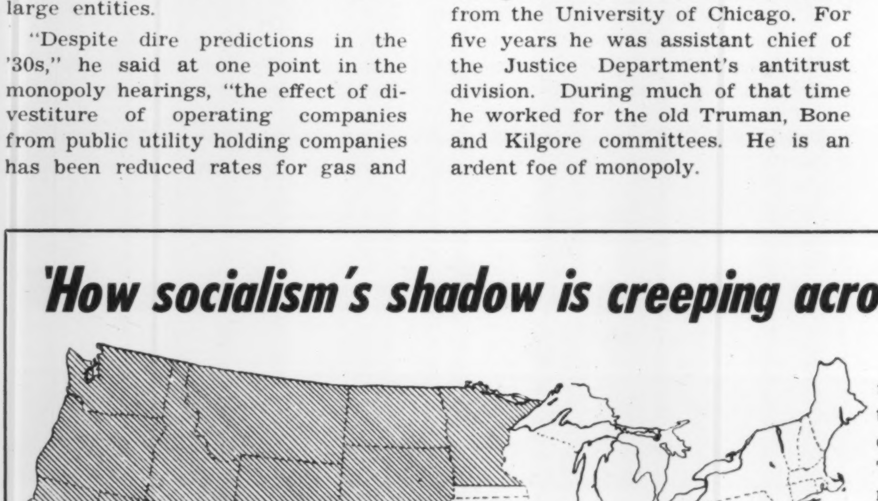

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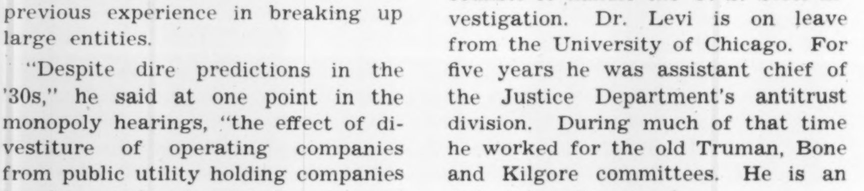

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ERP Nations Fear Cutbacks in U. S. Aid

They know about the economy spirit among some American congressmen. Nearly $3 billion is asked for the next Marshall Plan year, $2 billion for the year after that

MARSHALL Plan nations are braced for more cutbacks in American aid. They know that ECA Administrator Paul Hoffman will have a tough time getting Congress to approve $2950 million in new funds to finance the ERP program for the third year of its scheduled 51-month life.

The sum was reduced from the $3780 million approved for the current, second year of the program. Tentatively, $2 billion is planned in American aid for the fourth year of the plan. Europeans fear that it all won't get approved. The amendment introduced by Sen. Bourke B. Hickenlooper (Rep., Iowa) in the Senate Foreign Relations Committee to slash $600 million off the requested $2950 million is interpreted in Europe as a sign of the way the wind is blowing.

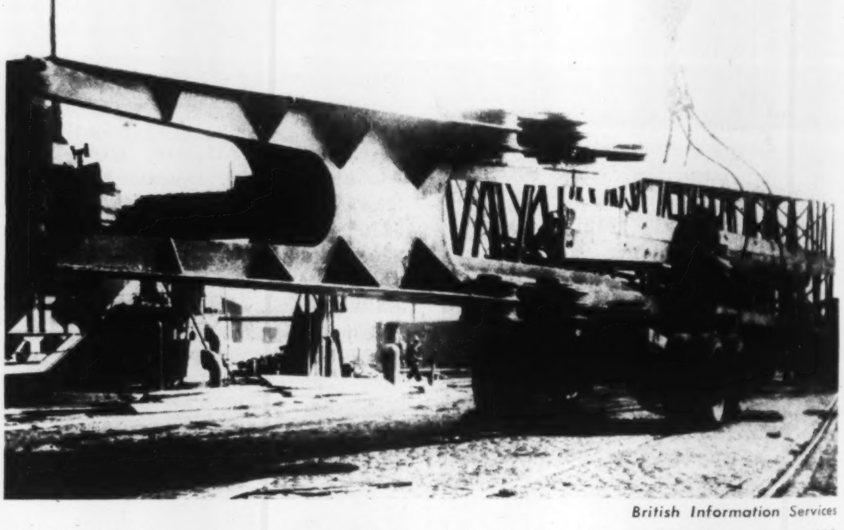
Payments Union Proposed — That $600 million matches the total proposed by Mr. Hoffman as a fund to be set aside to encourage greater exchange of goods within Europe. Part of it would go to set up an European payments union—an American-backed plan to permit the currency of any country to be freely exchanged for that of any other country.

The payments union would replace the present Intra-European Payments Plan. Unlike the existing plan, the new one would provide incentives for European creditor countries to increase their imports from European debtors. It would also induce debtors to reduce their deficits by requiring that deficits be paid in part out of non-Marshall dollars or gold.

It would require debtor countries to pay their own currencies directly to the clearing organization, form which any eligible creditor might draw.

Europe Recovers — One argument advanced to support curtailments in the aid program is that Europe doesn't need so much money. Congressmen point out that Europe's current industrial production is 15 per cent above the 1938 level despite much publicized strikes, devaluation and dollar shortages. Prewar export levels have been surpassed on a broad front. Even the dollar deficit has been almost halved since 1947. About 20 per cent of the national incomes of Europe's separate economies has been devoted since the war to investment in production facilities.

Europeans counter the argument by saying their economy is like a car being pushed up hill by a U. S. truck. The car is beginning to gather its own momentum now, but it continues to need outside power, or it will stall and perhaps roll all the way back down again. Western Europe will still have a dollar deficit of $2250 million by 1952, even if full Marshall aid is continued and economic conditions in the Western World remain good, estimates the Organization for European Economic Co-operation.



British Information Services

LONG HAUL: A Marshall Aid-financed Marion walking dragline—over 500 tons worth—made by Marion Power Shovel Co., Marion, O., was met by 50 vehicles at Liverpool, England. That much transportation was needed to haul the dragline 100 miles to its final destination, the United Steel Companies Ltd. opencast iron ore workings at Scunthorpe, Lincolnshire. Here you see the steel structure of the dragline being lowered onto a ten-wheeled trailer

U. K. Won't Join Payments Union

Great Britain may lose $150 million in Marshall Plan aid unless she joins with other European nations in the proposed European payments union, says Mr. Hoffman.

The ECA administrator says the cutback, amounting to almost one-quarter of the sum tentatively earmarked for Britain next year, will not be put into effect as "punitive action"; the money will simply go into the payments union, whether or not Britain joins. Mr. Hoffman admits the British would have some "very real problems" if they join. For one thing, their extensive financial commitments with sterling area countries would be complicated by the union.

In February, the British produced steel ingots and castings at the all-time record annual rate of 18,926,000 net tons, compared with the best previous annual rate of 18,378,000 tons set in May, 1949. In February, 1949, an 18,117,000-ton rate was reached.

The fate of the steel industry is more uncertain than ever. Prime Minister Clement Attlee surprised many by saying that the steel nationalization act is "on the statute book and our purpose is to give effect to acts passed by Parliament." Although he probably is not anxious for any immediate action on this matter, he did not back down and agree to some sort of postponement of the vesting date as the Conservatives tried to force him to do. The vesting date is Jan. 1, 1951.

Export business, especially in autos, is excellent. In January, 5749 British autos were sold in Canada, compared with 1139 in January, 1949, and 8 in January, 1948. Canada is the second-best customer, the best being Australia which bought 7842 in January. One of the best buyers on the continent is Belgium.

Belgium on Economic Rebound

Belgium would be hard hit by ECA cuts because she is now on the economic rebound. Business in the past three months has improved slightly but it is below the peak prewar levels in 1948 and early 1949.

The industrial production index for steel stood at 121.6 in January, compared with 117.4 in December. The period 1936-1938 is the base. Coal, metalworking and power production indexes declined slightly from December to January. February performance in all industrial categories improved, and the first quarter business level promises to be better than that for the last quarter of 1949.

Industrialists in metalworking plants still want government aid to cut down unemployment. One worker out of every eight is officially listed as jobless.

Belgian manufacturers are expressing growing interest in plans for production of American products such as home appliances in Belgium under licensing arrangements with U. S. makers. Another plan being explored by Belgian business men is to obtain component parts of American products and equipment for assembly in Belgium, thereby reducing customs duty and easing exchange difficulties. Nearly all the major American motor car companies assemble cars in Belgium where they add the tires, batteries, glass and upholstery. The tendency is to expand the use of local components.

Belgium is one of most attractive European markets for American investment because trade controls and restrictions are less onerous there than in many other countries.

Esperance Longdoz, Liege, Belgium, expects to place in operation next May or June a four-high four-stand 48-inch strip mill with a two-high roughing mill. The strip mill equipment was originally operated at the Weirton Steel Co. plant.

A number of inquiries have been received from Philippine importers covering mill equipment for the manufacture of wire nails, barbed wire and fencing.

Ruhr Drives To Lift Steel Limit

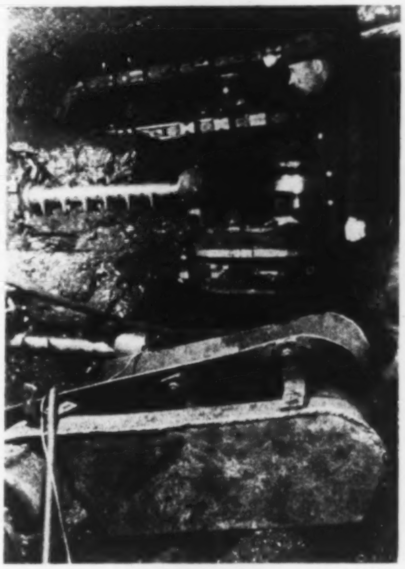
West Germany's problem is to convince the U. S. and other Allies that the ceiling on steel production, now set at 12.1 million net tons annually, should be lifted.

The Germans want the ceiling raised now to 13.7 million tons and eventually to 15.9 million tons. Production in February was at the legal limit, at the annual rate of 12.1 million tons.

The Ruhr appears to be on the economic rebound, too. Railroads have begun ordering again; the home construction program is gathering momentum; general exports are mounting. The production of automobiles is still climbing, particularly Volkswagens. The 100,000th Volkswagen built since the war rolled off the assembly line March 4. The company hopes to produce a two-seater sports roadster for the luxury trade. It would sell for about $2200.

East German Output Gains

East Germany says it produced 550,000 net tons of rolled steel products in 1949. Production plans for 1950 call for 396,000 tons of pig iron, 962,500 tons of ingot steel and 764,500 tons of rolled products. East Germany's steel requirements exceed 2.2 million tons annually. The difference is imported, mainly from Western Germany.



Sovfoto

SOVIET COAL CUTTER: This coal-cutting machine is at the work face of the Polysayevskaya colliery of the Leninugol administration, according to the official Soviet picture agency

Italian Projects Approved

Two industrial recovery projects for Italy—one involving steel mill equipment and the other for mechanization and development of the Sardinian coal mines—have ECA approval.

The purchase of additional steel mill equipment for Finsider for the Piombino and Cornigliano plants with ECA financing is approved as the second phase of an earlier Marshall Plan project for the same company. ECA dollar requirements for the second phase amount to $12,051,000 for expenditures in the U. S. Of the total, $247,000 is earmarked for the Piombino works, $11,304,000 for the Cornigliano works and about $500,000 for technical services. Overall cost of the second phase is estimated to be at the equivalent of $54 million.

First phase of the Finsider project was approved last August when ECA granted $12,007,000 to finance the purchase of steel mill equipment for plants at Bagnoli, Piombino and Cornigliano.

The project for mechanization and development of the Sardinian mines involves the Serbariu, Cartoghiana and Seruci mines in the Sulcis field, owned by Societa Mineraria Carbonifera Sarda, Rome. Each of the three mines will produce an estimated 1 million tons of washed coal per year when properly mechanized. The Sulcis district now produces 1 million tons of cleaned coal annually. ECA has approved $3,413,000 to finance this project.

Motor Exports Slipping

More capital goods shipped abroad minus electric motors to save on freight, customs

EXPORT sales of American electric motors are slipping.

Many U. S. motors are not sold directly to foreign customers, but to domestic manufacturers of capital equipment such as machine tools who are building for export. It is here that electric motor makers are being hit. Capital equipment exports are holding up fairly well, but more foreign customers are specifying that their capital equipment be shipped without the motor, wherever possible.

For Economy—That is specified mostly because of economy. The motorless equipment is lighter and freight charges are saved. There's a heavy customs duty on motors not built right into the equipment. The foreign buyer often saves money by using his own motor. A fourth factor hampering American motor exports is trade protection. In Canada and Great Britain, regulations require that foreign-built capital equipment can be imported only if locally produced motors, when available, are used. A fifth difficulty is that most overseas power systems are different than the American and our motors must be adapted for different specifications.

All these factors have existed for many years, but their effects are accentuated now by the dollar shortages abroad. What's more, until recently foreign — particularly European—production of motors was behind demand. Europeans could afford to let more American units in. Now, British motor output is 60 per cent ahead of what it was in 1938. Belgian motor manufacturers are looking for business.

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SEVEN STRONG REASONS explain the trend to N-A-X HIGH-TENSILE steel for:

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- Fenders
- Hoods
- Bodies
- Frames
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N·A·X GOOD FORMABILITY
N·A·X GREAT IMPACT TOUGHNESS
N·A·X EXCELLENT WELDABILITY
N·A·X HIGH CORROSION RESISTANCE
N·A·X HIGH FATIGUE RESISTANCE

GREAT LAKES STEEL CORPORATION N-A-X ALLOY DIVISION • ECORSE, DETROIT 2
MICH. • UNIT OF NATIONAL STEEL CORPORATIO

By **A. H. ALLEN** *Detroit Editor, STEEL*

Mirrors of Motordom

General Motors' financial report reveals new records. Sales total $5.7 billion, three and a half times prewar average. Net profit up a third from previous year

DETROIT

THIS is open season on financial reports for 1949 and, because they constitute a review of what has happened rather than revealing what is to come, they are classed as dull or routine reading by many. However, in the automotive industry the plushy statements for last year may well set a record of financial achievement not to be equaled for some time and hence it may be appropriate to examine some of the figures and what lies behind them.

A summary of the Chrysler record was given in these columns a week ago. It is dwarfed by the long-awaited General Motors document, released last Tuesday. The world of business and industry has never seen anything like it—total sales of better than $5.7 billion, or 21 per cent ahead of 1948 and 3½ times the 1936-1941 average. Net income tops $655 million, up $216 million from 1948 and equivalent to $14.64 per common share as against $9.72 per share the previous year. Earnings approximate the 1936-1941 average of 11.5 per cent on sales.

Two of Five Are GM—Production of 2,764,397 cars and trucks, U. S. and Canada, is equal to 42 per cent of the entire industry. Tax bill is equivalent to $13.20 per share and includes $468 million for income taxes and $112 million for state and local taxes, plus GM's share of social security taxes. On top of that sales and excise taxes on products sold by GM amounted to $299 million, which hoists total taxes on GM products for 1949 to $879 million.

The corporation's sales dollar last year was split up as follows: 50.3c to suppliers for materials, supplies and services, 26.2c to employees, 10.1c to the tax collectors, 1.9c to provide for depreciation and obsolescence of plants and equipment, 6.4c in dividends to 434,075 stockholders, and 5.1c retained for use in the business.

Big Bonus Distribution—The GM bonus committee decided to authorize transfer of $60 million from earnings to the bonus reserve and to grant 4204 bonus awards aggregating $49,887,505. They will comprise 163,859 shares of common stock and $39,739,717 in cash and are delivered in annual installments over a period of not more than five years, beginning immediately. Minimum monthly salary for bonus recipients is $650, although a few are given to persons earning less than this figure. There are still unpaid bonus awards for 1947 and 1948 amounting to better than $70 million. With 115,000 salaried employees on the payroll out of an average total, including hourly-rated personnel, of 401,326, it is seen that bonuses go to about one out of every 27 salaried employees.

Union To Yell—Very shortly you can expect to hear the anguished cries from union leaders over the "morally indefensible" GM profits of $656 million, not to mention the millions transferred to the bonus reserve, in which its members do not participate. And it is not only from union circles that you hear disquieting expressions of doubt over the justification of any organization earning so much money in a single year. Patient explanations of the fact that the profit is only 11.5c on the sales dollar, or probably less than the corner grocery salts away, or mention of the fact that GM's business meant fattening of government treasuries by $879 million, seem to do little good. The reply is generally to the effect that $656 million is a lot of money, and why not reduce prices or boost wages. Well, at the same time the sale of $5.7 billion worth of automobiles, diesel engines, refrigerators and other items is a hell of a chunk of business, and it is all sold competitively.

Auto, Truck Output

U. S. and Canada

	1950	1949
January	610,211	445,092
February	502,422*	443,734
March		543,711
April		569,728
May		508,101
June		623,689
July		604,351
August		678,092
September		657,073
October		601,021
November		474,731
December		384,318
Total		6,533,641

Weekly Estimates

Week Ended	1950	1949
Feb. 25	125,285	118,815
March 4	124,072	118,267
March 11	126,051	114,223
March 18	128,000	120,741

Estimates by Ward's Automotive Reports

* Preliminary.

Profits Fluctuate—GM has something to say on this score, pointing out that during a period of generally good business, profits tend to rise rapidly both in terms of dollars and in relation to sales. In other words, when the volume of sales is higher than the average volume over a given period, profits at the higher volume exceed the average profits for the given period by a greater percentage than the increase in sales. Conversely, when sales are below the average, the rate of profit decline is greater than the drop in sales.

Profits fluctuate in this way because of the importance of the element of fixed costs, which must be met whether business is good or bad. If profits did not fluctuate, prices would have to be increased in periods of low volume, but would fall in periods of high volume. Such a movement would be neither desirable nor would it be practical in automobiles where any approach to pricing is subject to the impact of both costs and competition.

Workers Average $68.41 Weekly—GM hourly-rated employees did not fare too badly last year, splitting up a payroll of $1019 million and earning an average of $68.41 per week for an average 39.5-hour five-day stretch. Many of them (16,597 to be exact) cashed checks aggregating $687,562 for acceptable ideas to improve plant practices and equipment. They bought $54.9 million worth of U. S. savings bonds, and 90 per cent of them participated in the corporation's contributory group insurance plan, under which benefits of better than $14 million were paid last year.

So it's big business. Perhaps GM might well be considered the mainspring in the "revolution on wheels" which has swept over the U. S. in the first half of the 20th century. GM sees behind the accompanying miraculous progress in the mechanical arts, medicine, physics and chemistry three motivating forces—expansion of fundamental knowledge

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through scientific research, provision of adequate economic rewards for great accomplishment, and exercise of individual responsibility and self-reliance.

Believe Expansion Permanent—GM believes the market for new automobiles has been expanded permanently, with a good backlog of demand still in existence. However, it is observed that once this backlog has been satisfied, operations will recede from the peak rate of 1949 and the present.

Packard Net Drops

Perhaps a little less roseate in hue, but still nothing to cause undue alarm, is the Packard financial report which reveals net income of $7.7 million on sales of $214 million, the equivalent of 51 cents a share, or about half of what was earned in 1948. Despite the profit decline, the company built 104,593 cars, second only to the 1937 record. Price reductions of $103 to $246, introduced last May, doubtless caused some of the drop. Dividends of 50 cents per share were paid last year and at their most recent meeting directors decided to withhold any dividend action now, causing a slight jolt to the company's stock in New York trading.

At the end of the year, Packard working capital was $43.7 million, down $3.2 million from Dec. 31, 1948. The company is drawing up ambitious long-range plans for a more competitive future which, it is reported, will require substantial cash outlay during the first half of this year. Just what these are remains to be disclosed. At one time it was known that a new V-8 high-compression engine was on the drawing boards and considered a "hot" project which would obviously entail expenditure of a considerable sum for new machining equipment. Also, the company recently placed tooling for entirely new 1951 model fenders with an outside source, and these dies are by no means inexpensive.

Study Quality Control

Increasing consciousness of the importance of statistical quality control in automotive manufacturing is seen in a new plan instituted by Ford, under which invitations are being extended to 600 selected major vendors of production parts, asking them to send representatives to the Rouge plant for a two-day training course in statistical quality control. So far, 134 vendors' representatives from 57 companies have attended the courses, and in addition 4100 Ford supervisors and trainee foremen have completed similar training.

The technique is described as the control of product quality through analysis of statistical charts of current and past production. Even with 100 per cent inspection, some industries have found that as much as 15 per cent in defective parts escape detection. Under statistical quality control, it is claimed, this high proportion can normally be reduced to less than 1 per cent. At present 90 per cent of all Ford production departments have one or more applications of chart control in effect. It has been felt advisable to offer the benefit of the experience thus obtained to vendors. W. H. Smith is manager of the department.

K-F Plant for Israel

An automobile assembly plant to build 6000 cars a year is being set up in Haifa, Israel, for production of Kaiser-Frazer models starting in August. Assembly equipment is being shipped from this country and technical supervisory personnel from Willow Run will be sent to train the 300 Israelis who will staff the 115,000 sq ft plant, underwritten by local capital to the extent of $2.5 million.

Materials Handling Wonder

Up to schedules of 80 cars an hour in just nine weeks after its completion, the new Olds assembly plant at Lansing, Mich., has left visiting materials handling engineers breathless. The final assembly conveyor line includes a total of 42 individual conveyors, 18 lines and 24 feeders. Their total length is about 5000 ft. Highest speed reached by any of the single line conveyors is 32 ft per minute, and a spacing of 21 ft per car figures out to one completed car every 45 seconds. Various drive systems for the entire line require some 85 motors and 18 variable-speed drives.

Lower Priced Champion Coming

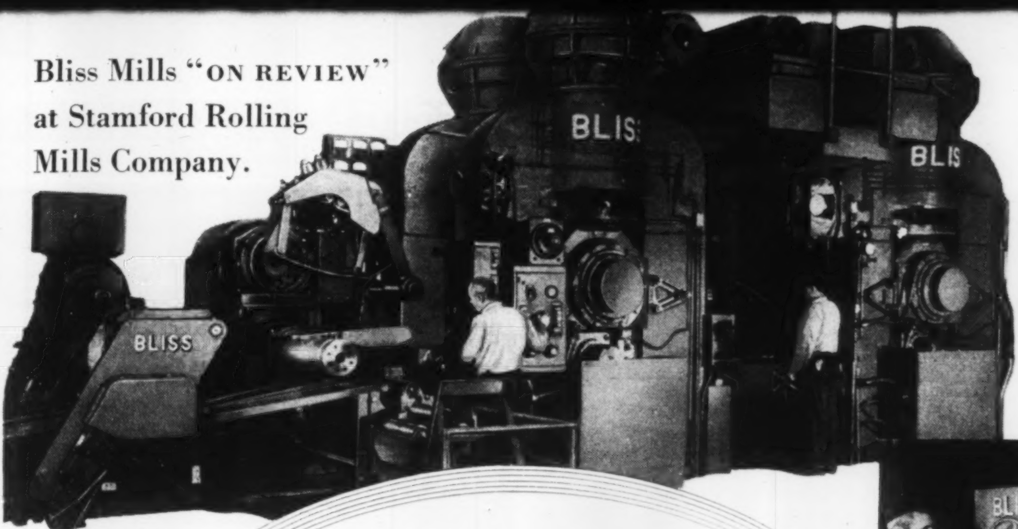
Studebaker Corp. officially announced lower priced Champion models.

Dealers will be sampled with the cars this week. They will carry a factory list price $75 lower than the Champion Deluxe series and will be known as the Custom series. Prices will be between those of the Chevrolet Special and the lowest priced Plymouth line.

The new series will be identical with the deluxe series except for elimination of minor features and less expensive upholstery. They'll have no hood ornament, no stone guards, no decorative molding around the front seat, less chromium, only one horn and one sun visor.

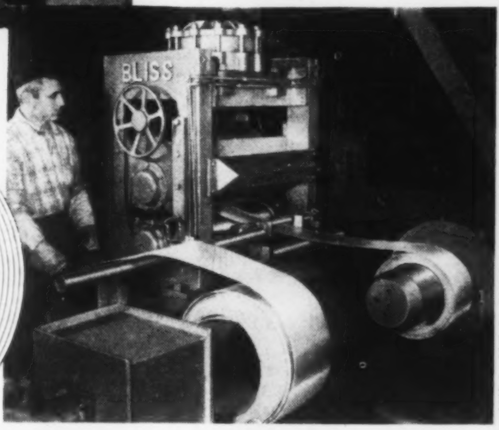
OPERATING COMMITTEE: These eight key administrative executives of Packard Motor Car Co. comprise a newly established committee charged with co-ordinating all top management functions. It is directly responsible to the Packard president and the board of directors. Seated are: K. M. Greiner, vice president and general sales manager; G. H. Brodie, vice president in charge of co-ordinating operations; Col. J. G. Vincent, executive vice president; E. C. Hoelzle, vice president, comptroller and secretary; G. C. Reifel, vice president of manufacturing. Standing are: H. W. Hitchcock, director of advertising and public relations; W. H. Graves, vice president of engineering; and Milton Tibbetts, vice president and patent counsel. Col. Vincent is chairman and Mr. Brodie serves as secretary of the operating committee

Bliss Mills "ON REVIEW"
at Stamford Rolling
Mills Company.

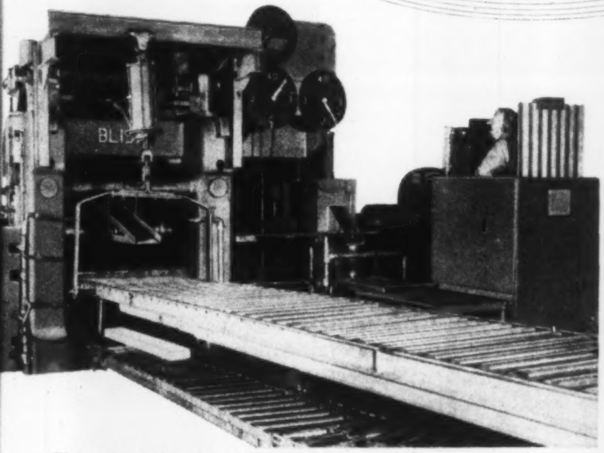


Brass and copper breakdown is the job of this Bliss 4-high, 2-stand Tandem Strip Mill. Bliss coiler, at far left, coils flat bars. Tension reel winds lighter-gauge coils.

Heavy-gauge coils and flat bars are easily handled by this Bliss pinch roll feed. Entry side auxiliaries are designed to handle either coil or flat-bar stock.



All different rolling jobs...... All different Bliss Mills



This 3-high hot breakdown mill—used for three to five pass work—is being equipped with Bliss mill tables to facilitate and speed manipulating of brass bars.

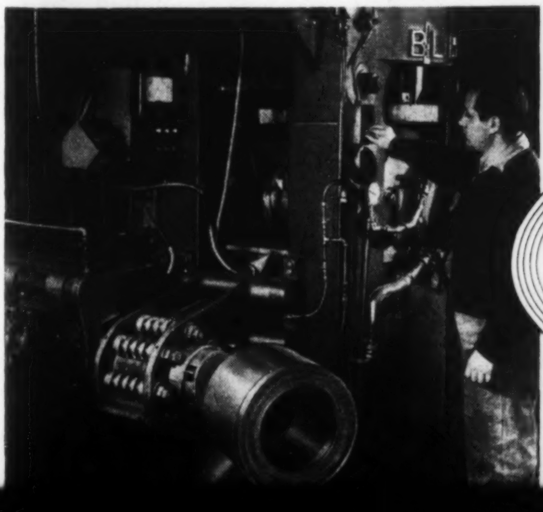
You'd expect to see a variety of mills kept busy where so many different alloys and gauges of quality copper and brass are rolled in such large quantities as at the Springdale, Conn., plant of STAMFORD ROLLING MILLS COMPANY.

Here is a model of integrated production efficiency whose rolling mill equipment is predominantly BLISS—a 3-high hot breakdown mill, a 4-high, 2-stand tandem strip mill, a cluster mill for rundown, and another 4-high mill doing most of the finish rolling. In addition, the copper mill is being revamped for Bliss equipment.

Almost every mill is also equipped with Bliss accessories. The tandem mill, used for breakdown of both bar and coil stock, uses a Bliss pinch roll feed with a Bliss coil mandrel and elevator for quick, easy opening and handling of heavy-gauge coils. Flat bars are coiled on a Bliss coiler, and a Bliss tension reel, with belt wrapper, winds lighter gauges into compact, easy-to-handle coils. This complete Bliss mill unit has been operating at from 700 to 800 fpm for two years, working 16 hours a day, five days a week.

All the work-saving features of Bliss rolling mills and accessories can fit your production scheme, whether you do hot or cold rolling of ferrous or non-ferrous metals. Our engineers will be glad to discuss your problem with you.

Brass stock is finish-rolled in Bliss 4-high finishing mill.



E. W. Bliss Co.

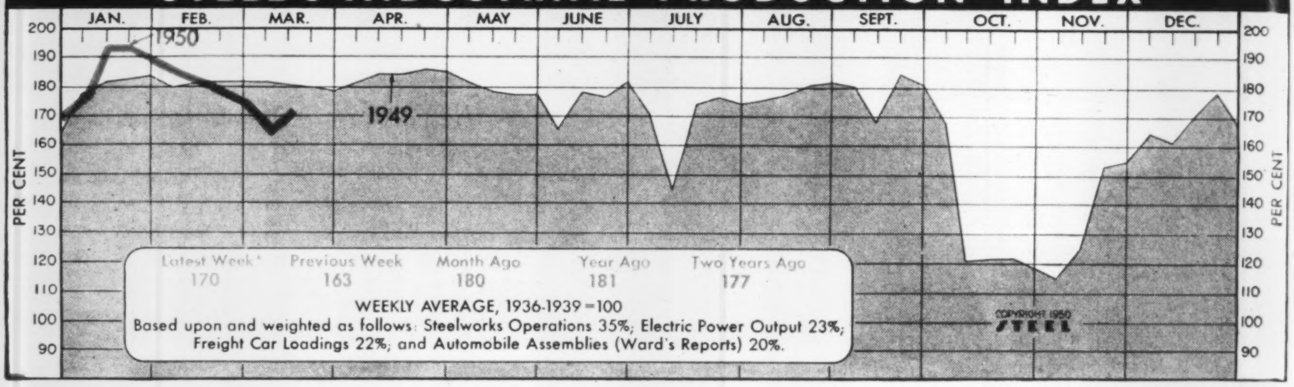
General Office: Toledo 7, Ohio

Rolling Mill Division

Salem, Ohio

Rolling Mills, Mechanical and Hydraulic Presses,
Container Machinery

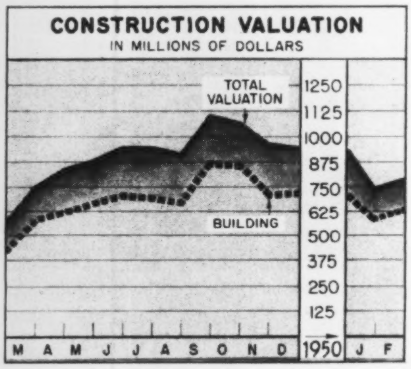
STEEL's INDUSTRIAL PRODUCTION INDEX



Latest Week*	Previous Week	Month Ago	Year Ago	Two Years Ago
170	163	180	181	177

WEEKLY AVERAGE, 1936-1939 = 100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.

*Week ended Mar. 11 (preliminary).


CONSTRUCTION VALUATION
IN MILLIONS OF DOLLARS

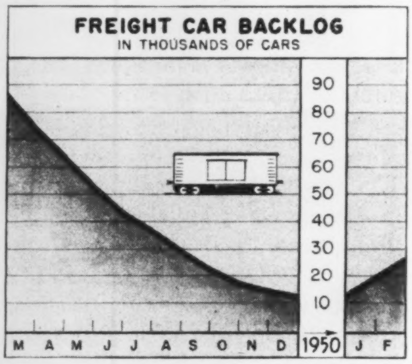
Charts—Copyright 1950, STEEL.

Construction Valuation

(37 States)—In Millions of Dollars

	Total 1950	Total 1949	Building 1950	Building 1949
Jan.	730.9	483.0	578.8	381.0
Feb.	779.5	568.5	627.0	415.0
Mar.	....	747.6	....	579.2
Apr.	....	842.6	....	620.2
May	....	880.3	....	666.9
June	....	945.7	....	706.7
July	....	943.6	....	690.9
Aug.	....	905.7	....	671.5
Sept.	....	1,093.7	....	870.6
Oct.	....	1,061.8	....	857.8
Nov.	....	957.8	....	701.3
Dec.	....	929.0	....	722.2
Total	....	10,359.3	....	7,883.3

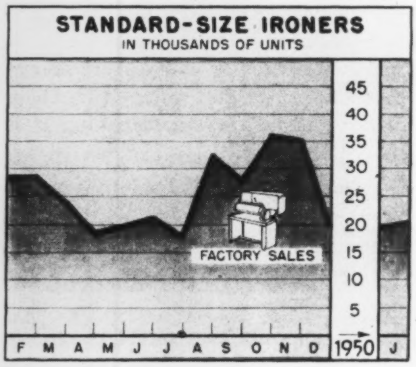
F. W. Dodge Corp.


FREIGHT CAR BACKLOG
IN THOUSANDS OF CARS

Freight Car Awards and Backlogs

	Awards 1950	Awards 1949	Backlogs* 1950	Backlogs* 1949
Jan.	9,385	1,663	19,026	96,214
Feb.	9,075	332	26,055	85,974
Mar.	....	199	.....	73,188
Apr.	....	30	.....	62,569
May	....	589	.....	52,281
June	....	153	.....	42,813
July	....	408	.....	36,564
Aug.	....	185	.....	28,731
Sept.	....	123	.....	22,203
Oct.	....	201	.....	17,377
Nov.	....	1,145	.....	14,146
Dec.	....	1,220	.....	12,036
Total	....	6,248	*End of month.	

American Railway Car Institute


STANDARD-SIZE IRONERS
IN THOUSANDS OF UNITS

Standard-Size Ironers

Factory Sales—Units

	1950	1949	1948
Jan.	20,300	28,300	40,192
Feb.	.....	28,400	51,651
Mar.	.....	23,800	53,686
Apr.	.....	18,100	47,319
May	.....	19,500	44,954
June	.....	21,100	32,767
July	.....	17,700	26,679
Aug.	.....	32,300	35,203
Sept.	.....	27,700	37,308
Oct.	.....	36,045	38,517
Nov.	.....	35,000	42,000
Dec.	.....	19,400	26,000
Totals		307,345	476,860

American Washer & Ironer Mfrs. Assoc.

Issue Dates of Other FACTS and FIGURES Published by STEEL:

Employ., Steel	Feb.20	Machine Tools	Feb.27	Ranges, Gas	Jan.2
Fab. Struc. Steel	Mar.6	Malleable Castings	Feb.27	Refrigerators	Mar.6
Foundry Equip.	Mar.13	Mfrs. New Orders	Jan.2	Steel Castings	Feb.27
Furnaces, Indus.	Jan.2	Price Indexes	Mar.6	Steel Forgings	Feb.20
Furnaces, W. Air	Jan.2	Pumps	Mar.13	Steel Shipments	Mar.13
Gear Sales	Mar.6	Purchasing Power	Mar.13	Trucks, Elec. Ind.	Jan.2
Ind. Prod. Index	Mar.13	Radio, Television	Mar.6	Vacuum Cleaners	Feb.27
Gray Iron Cast.	Mar.6	Ranges, Elec.	Jan.2	Washers	Mar.13

Construction Contacts Rise

February's contracts for building and heavy engineering works in the 37 states east of the Rocky mountains were up 7 per cent over January's aggregate. All classifications: Residential, nonresidential and heavy construction topped the January totals. Only heavy construction was lower in February than in the same month a year ago.

Cumulative total for the first two months this year is in excess of $1510 million, a 44 per cent increase over the aggregate for the corresponding 1949 period.

Heavy construction for the period shows a 19 per cent rise over the same months in 1949. Last month's awards at $152.5 million are less than 1 per cent below those in February, 1949.

Residential projects amounted to $361.4 million in February of which $342.3 million was private building and $19.1 million public. The gains over January and February a year ago were 5 per cent and 87 per cent, respectively.

Car Buying Remains Strong

Freight car ordering continued at a good pace in February, orders placed during the month totaled 9075. In January orders totaled 9385. Orders placed in the first two months of this year are almost three times as high as in all 1949. Car builders got 3775 cars in February's awards and the railroad shops 5300.

Backlogs are now more than double what they were on Jan. 1. At the end of February the backlog was: Car builders, 10,668; railroad shops, 15,387; total, 26,055.

February deliveries totaled 2046 cars with the car builders producing 917 and the railroad shops adding 1129. Production on the leading types of cars was: Box, 313; hopper, 524; flat, 772; gondola, 251; refrigerator, 41; and tank, 90.

The Business Trend

As manufactures get into high gear to take advantage of a strong demand, they are going to find their schedules disrupted by shortages in their own or in suppliers' plants

PRODUCTION pace in all segments of metalworking is near the level attained before the coal strike put a damper on operations. Manufacturers are not out of the woods yet. As companies strive to maintain production at high levels to take advantage of strong demand, they will find their schedules disrupted by shortages, either in own plants or those of suppliers.

The next few weeks will show whether the demand in many lines is genuine or whether it was, as pessimistic observers say, caused by buyers closing deals to beat coming shortages. Preponderance of opinion in metalworking is that demand is firm and protective buying was small.

Settlement of the Chrysler strike did not follow closely on the heels of the end of the coal dispute as many observers expected. Resumption of output at Chrysler will add materially to metalworking activity and complete the poststrike recovery. Then the metalworking industry will have a short breathing spell until the United Auto Workers make their demands on General Motors.

Industrial Production . . .

In the week ended Mar. 11, STEEL's industrial production index climbed 7 points to 170 per cent (preliminary) of the 1936-1939 average. Most of the gain came in freight carloadings and steelworks operations. In the like 1949 week the index was 181.

Automobiles . . .

Automakers are rolling up their sleeves and pushing schedules up to virtual capacity to get ready for the usual spring spurt in sales. First quarter passenger car and truck output will total about 1,618,000 units in U. S. plants. Losses due to the Chrysler strike and overtime suspensions to conserve fuel amounted to about 275,000 units by last week end. These losses represent the difference between the first quarter total and a new alltime quarterly assembly record for U. S. plants. In the week ended Mar. 11, outturn in both U. S. and Canadian plants was 101,424 passenger cars and 24,627 trucks.

Steelmaking . . .

Steelmaking last week was within striking distance of the pace maintained before fuel shortages forced cutbacks. This week will find the rate inching up to the level recorded in the early weeks of this year. In the week ended Mar. 11, operations made a small recovery to 73 per cent of capacity from 69 per cent in the preceding week.

Inventories . . .

Total business inventories at the end of January were estimated at $53.5 billion by the Commerce Department. After allowance for seasonal fluctuations, the book value of inventories increased by $150 million in January. Manufacturers' stocks rose about $100 million during the month. The rise was the first monthly increase in over a year. Durable

BAROMETERS of BUSINESS

INDUSTRY	LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
Steel Ingot Output (per cent of capacity)†	73.0	69.0	91.5	100.5
Electric Power Distributed (million kilowatt hours)	5,936	5,879	5,971	5,531
Bituminous Coal Production (daily av.—1000 tons)	512	437	1,090	1,768
Petroleum Production (daily av.—1000 bbl.)	4,827	4,909	4,951	5,181
Construction Volume (ENR—Unit $1,000,000)	$210.6	$133.4	$141.9	$184.6
Automobile and Truck Output (Ward's—number units)	126,051	124,072	125,737	114,223

*Dates on request. †1950 weekly capacity is 1,906,267 net tons. 1949 weekly capacity was 1,843,516 net tons.

TRADE	LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
Freight Car Loadings (Unit—1000 cars)	665†	574	567	709
Business Failures (Dun & Bradstreet, number)	221	179	195	179
Money in Circulation (in millions of dollars)‡	$27,105	$27,060	$26,985	$27,577
Department Store Sales (changes from like wk. a yr. ago)‡	none	−5%	−1%	−8%

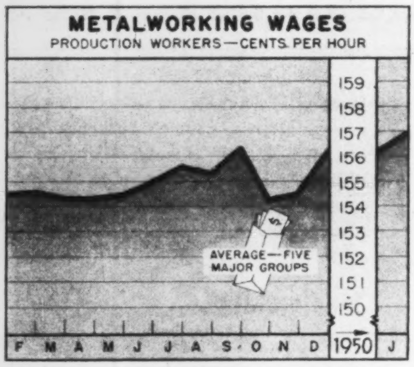
†Preliminary. ‡Federal Reserve Board.

FINANCE	LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
Bank Clearings (Dun & Bradstreet—millions)	$13,308	$14,484	$14,360	$12,233
Federal Gross Debt (billions)	$255.9	$256.2	$256.6	$252.0
Bond Volume, NYSE (millions)	$20.5	$19.3	$18.3	$14.8
Stocks Sales, NYSE (thousands of shares)	7,532	7,932	8,739	4,515
Loans and Investments (billions)†	$66.8	$67.0	$67.3	$62.0
United States Gov't. Obligations Held (millions)†	$36,774	$37,162	$37,595	$33,069

†Member banks, Federal Reserve System.

PRICES	LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
STEEL's Weighted Finished Steel Price Index††	156.13	156.13	156.13	154.85
STEEL's Nonferrous Metal Composite‡	158.5	159.8	159.9	227.9
All Commodities†	152.0	152.6	151.6	159.0
Metals and Metal Products†	169.3	169.2	169.3	174.8

†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.

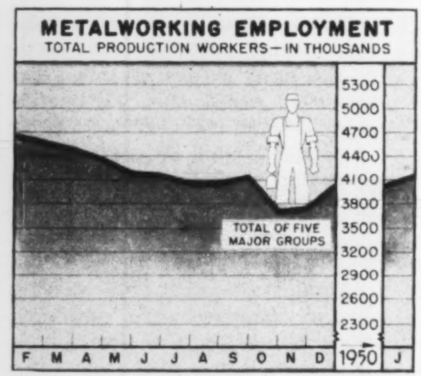


Metalworking Hourly Wages

Production Workers—Five Major Groups

1949	Prim. Mtls.	Fab. Prod.	Mach-inery	Elec. Mchy.	Trans. Equip.
Jan.	159.1	145.3	152.4	143.6	166.0
Feb.	159.3	145.4	152.4	144.0	165.3
Mar.	158.7	145.2	152.5	144.5	163.7
Apr.	158.2	145.2	152.3	144.4	164.3
May	158.4	145.3	152.3	144.3	165.0
June	158.1	146.4	152.9	144.0	165.8
July	159.1	146.6	153.0	144.7	166.1
Aug.	158.1	146.8	153.1	145.1	166.0
Sept.	160.7	147.4	153.8	144.7	167.4
Oct.	155.6	145.9	153.6	143.5	165.6
Nov.	158.0	145.1	153.8	143.5	166.2
Dec.	159.7	147.2	154.3	144.6	168.4
1950					
Jan.	160.1	149.0	154.5	145.4	168.4

Bureau of Labor Statistics



Metalworking Employment

1949	Prim. Mtls.	Fab. Prod.	Mach-inery	Elec. Mchy.	Trans. Equip.
Jan.	1,090	767	1,155	623	1,038
Feb.	1,077	752	1,133	607	1,021
Mar.	1,062	729	1,108	585	1,017
Apr.	1,028	706	1,066	560	1,012
May	991	683	1,014	538	955
June	971	679	977	518	995
July	934	671	939	505	1,014
Aug.	932	688	927	507	998
Sept.	938	708	935	531	1,017
Oct.	559	677	922	548	986
Nov.	737	666	908	546	898
Dec.	953	688	931	556	898
1950					
Jan.	966	695	941	553	977

Bureau of Labor Statistics

Charts—Copyright 1950, STEEL.

goods inventories in January were unchanged from the preceding month.

Railroads . . .

Class I railroads' January net income after interest and rentals was $11.5 million, compared with $13 million in January, 1949. Before interest and rentals net income was $32.8 million or about $1 million less than a year ago. Operating revenues in January were about $657 million, a decrease of 10.1 per cent from January, 1949. Association of American Railroads says 41 Class I railroads failed to earn interest and rentals in the month being reported.

Employment . . .

Labor Department's Bureau of Employment Security presents two reports that show a mixed labor picture. Although the rate of industrial layoffs among workers covered by state unemployment insurance dropped substantially in February, there was a rise of four in the "E" list of areas where unemployment is 12 per cent or more. Weekly number of initial claims indicating new unemployment declined from an average of 378,100 in January to 290,100 in February. Total number on the "E" list at month's end was 43.

More Machine Tool Buying

Upturn in machine tool sales is expected in 1950 because of need for replacement in manufacturing plants, pressure for reduction in manufacturing costs and inability of many companies to further postpone decisions regarding modernization. This is the view of Jerome A. Raterman, president, Monarch Machine Tool Co., Sidney, O.

Monarch's sales in the first two months in 1950 already reflect this situation, he adds, and says the company hopes for an acceleration of this trend as the year continues.

Mild Improvement Due

While Warner & Swasey Co., Cleveland, expects its 1950 machine tool shipments to run ahead of 1949, volume will still be considerably below 1948, says Donald Pattison, vice president-sales.

Mr. Pattison estimates machine tool shipments this year will total about $8 million, compared with $6,775,595 in 1949. Total shipments including non-machine tool lines should amount to about $12.5 million, he adds. Total shipments last year when the company was strikebound for several months were $9,228,009. Company also builds textile machinery and the Gradall for construction.

Prospects Fair

Metalworking executives in annual reports say business is good for those who go after it

BUSINESS prospects in the foreseeabe future look good to many metalworking companies. Optimistic appraisals covering 1950 operations are contained in the annual reports of metalworking companies producing a variety of lines ranging from consumer durables to capital equipment.

Consensus is that business is available for the company with the aggressiveness and ingenuity to go out and get it. No one expects customers to buy unless they get more for their money than they can get from competitive lines. In all lines goods have to be sold, not only as to price but also on the advantages inherent in the product.

Selling Emphasized—Sales and advertising organizations are being revitalized, are being equipped with more tools of the trade. Numerous company sales meetings on either a regional or national basis recognize the need for an allout effort.

The Administration's attitude on business prospects for this year is stated by Acting Chairman Leon Keyserling, President's Council of Economic Advisers.

Unemployment To Be Problem—He says this will be a prosperous year but not of sufficient expansion to avoid a problem of unemployment which is already too high.

Mr. Keyserling illustrates his theory of need for continuous expansion with the statement that average unemployment in 1949 was 3.5 million, twice as high as in 1948 even though sales and production were down only about 1 per cent. He chides businessmen who halt expansion programs to build liquid reserves for a depression with the remark, "the economy doesn't operate on liquidity, it operates on action—you could liquidate everything and have no business at all."

Business Pace Brisk

Business continued at a sprightly pace in February following a good start in January say members of the Chicago Association of Purchasing Agents. This is a striking comparison with a year ago when most members' attitudes were on the gloomy side.

Improved production, following the pattern in effect since last August, was reported with the number reporting lower production (14 per cent) at the lowest point since October, 1948. Growing backlogs indicate expanding volume, 38 per cent say backlogs are higher and 19 per cent lower. In February, 1949, answers to the same question were: Higher, 6 per cent; and lower, 67 per cent.

Deliveries continue to slow down for one out of three members. Prices are still on the increase for the same proportion. Inventories were about the same in February as a month earlier, 60 per cent showed no change. This change is very noticeable compared with a year ago since most firms were reducing inventories at that time.

Maytag Demand Tops Output

Outlook for Maytag Co., Newton, Iowa, in 1950 appears to be good assuming a favorable business climate, says Fred Maytag II, president. The company has been unable to keep abreast of demand for automatic washers even though its new plant reached normal production in December. Sales of the new washer provided substantial additional volume for the company last year and by the end of the year starting costs for the new line were absorbed.

Orders Exceed Expectations

Orders received by Marion Power Shovel Co., Marion, O., for new machines during January and February exceeded yearend expectations. It now appears the company will have a manufacturing load sufficient to operate its production facilities at maximum capacity for at least the first six months this year. This forecast is based on orders on hand and the immediate potential for the company's products.

Trailer Sales Spurt

Sales in the early part of March topped those for the same period in February and the earlier month was one of the best peacetime months in company history, reports Roy A. Freuhauf, president, Freuhauf Trailer Co., Detroit. February's volume was about $8 million.

Company sales showed a sharp increase in all lines during February. Normally an upswing of purely temporary character is due to unusual activity in the sale of one or two specific models or types, Mr. Freuhauf explains, but the present increase is general. Company surveys indicate the sales activity represents an expansion of truck fleets and is not due to replacement of existing fleets.

Why Prices Are Higher

Take a look at what taxes and employment costs are taking per ton of steel shipped

METALWORKING executives don't have to be told their cost of doing business is going up. But some of them have no readily available graphic presentation to show both the extent and rate of this rise.

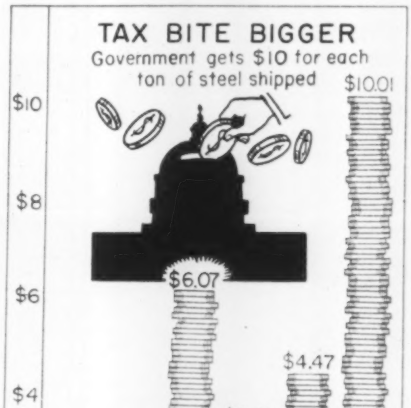
U. S. Steel Corp. presents a well documented story of its operations and finances since 1902 that applies to some degree to many metalworking companies. The corporation's report includes a multitude of facts pertaining to operations in both lean and peak years.

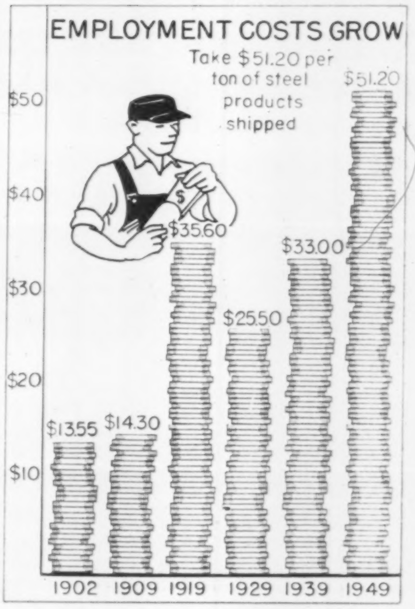
Accompanying charts show how taxes and employment costs per ton of steel shipped are rising.

Labor's Take Quadrupled—Employment costs per ton of steel products shipped rose to $51.20 per ton in 1949 from $13.55 per ton in 1902. The figure for the latest year represents a 55 per cent rise over 1939. A further rise in 1950 is certain because pension and insurance benefits granted in settling the steel strike will cost $67.5 million, the corporation estimates, and these benefits plus higher social security taxes total $3.88 per ton.

Taxes Increase 40-Fold — Taxes show an even higher proportionate rise per ton of steel products shipped in U. S. Steel's history. From only 27 cents per ton in 1902, taxes per ton rose to $10.01 in 1949. The tax per ton in the latest year is 124 per cent higher than in 1939.

All of the years shown on the chart depicting the rise in taxes are peacetime years. In 1919, one year after World War I, taxes per ton amounted to $6.07 per ton. This tax burden was reduced in each of the succeeding years. In 1946, one year after World War II, taxes per ton were $4.57. Taxes per ton not only have not decreased but increased in each year following the war and reached the peak to date shown for 1949.





Return on Sales Lower—Another interesting development in U. S. Steel's report is net income as related to sales. In the four postwar years the net income has averaged 6.1 per cent of sales on operations averaging 86.5 per cent of capacity.

In the period before the war, in years when operations averaged between 80 and 90 per cent of capacity, the net was 11.8 per cent of sales. In all the peacetime years of the corporation's history before the war net income averaged 8.8 per cent on operations averaging 70.8 per cent of capacity.

Market Still Growing

Market for the dictating machine has hardly been scratched, says C. K. Woodbridge, president, Dictaphone Corp., New York. In these days of heavy operating costs and complexity of office procedure, machines that increase materially one's capacity to do things and effect substantial economies should and do find increasing acceptance, he explains.

The company's new Time-Master dictating machines are finding a receptive market. Evidence of this fact is the substantial improvement in manufacturing operations in 1949 over the preceding year.

Men of Industry

ROBERT P. MERRITT

ERNEST W. SMITH JR.

RICHARD AUBREY

Robert P. Merritt and **Ernest W. Smith Jr.** were elected president and executive vice president, respectively, of **Hartford Special Machinery Co.,** Hartford, Conn. Mr. Merritt succeeds his father, the late **Joseph Merritt,** one of the founders of the company. Other officers elected are **William H. Storrs,** vice president in charge of engineering; **Raymond J. Dunn,** secretary and treasurer; and **Edward J. Sanderson,** assistant treasurer and comptroller.

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Gordon F. Simons was appointed director of research, **Beryllium Corp.,** Reading, Pa. He has been associated with the company in process development and product research since its inception. **W. Thomas Peterson** will succeed Mr. Simons as general sales manager on Mar. 20. He has been active in the automotive industry for over 20 years as a sales engineer and has represented Beryllium in the Detroit area for several years.

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Michigan Wheel Co., Grand Rapids, Mich., appointed **Robert E. Cope** as general manager of its newly expanded Permanent Molding Division. He formerly was associated with Aluminum Co. of America as product engineer, and Aluminum Permanent Mold Co. as plant manager.

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Donald K. Rennie was appointed works manager, **American Brakeblok Division,** American Brake Shoe Co., New York, and **James W. Green Jr.** was appointed superintendent of Brakeblok's Winchester, Va., plant, succeeding Mr. Rennie.

—o—

Robert W. Purcell and **Max J. Zivian** were elected to the board of directors, **Portsmouth Steel Corp.,** Cleveland. Mr. Purcell is vice chairman of Alleghany Corp., Cleveland, and Mr. Zivian is president, Detroit Steel Corp., Detroit.

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F. S. Jones was elected vice president in charge of sales, **Colorado Fuel & Iron Corp.,** Denver, effective Apr. 1. He will succeed **Newell H. Orr** who has retired but who will continue in an advisory capacity. Mr. Jones is succeeded as general manager, commercial steel sales, western division, by **James N. Counter,** promoted from Rocky mountain division sales manager. Both men will have offices in Denver.

—o—

William G. Miller was appointed executive assistant to the chairman and president of **American Locomotive Co.,** New York. Since 1948 he has been manager of the company's Auburn, N. Y., plant. He is succeeded at Auburn by **Charles T. Lathrop,** formerly Auburn works manager.

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Carl L. Zak, general sales manager, **Pittsburgh Steel Co.,** Pittsburgh, has resigned.

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Addition of six sales application engineers to district sales offices of **Reliance Electric & Engineering Co.,** Cleveland, was announced. They will be located in Pittsburgh, Cleveland, Syracuse, Detroit, Philadelphia and New York, and to these respective cities are assigned **Keith E. Carter, Thomas R. Corn, Ralph I. Coryell, Warner Jennings, William C. Mitchell,** and **H. Norris Robinson. Robert O. Gee** was assigned to applied engineering department at the company's home office, Cleveland.

Richard Aubrey was appointed assistant to the vice president in charge of operations, **Kaiser Steel Corp.,** Fontana, Calif. He will have charge of liaison on tubular steel products, and will help Kaiser customers solve pipeline problems. Formerly with Basalt Rock Co. and Youngstown Sheet & Tube Co., Mr. Aubrey holds several basic patents on tubular testing procedures.

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R. E. Johnson was appointed Los Angeles manager, industrial division, **General Electric Co.** He succeeds **E. M. Ellis,** who will head GE's apparatus department in Los Angeles. **Verne E. Dodson,** assistant to GE's Pacific district manager at San Francisco, was appointed district manager of engineering for the northwestern district with headquarters at Seattle.

—o—

R. M. Rich, vice president in charge of operations at Fontana, Calif., Kaiser Steel Corp., was appointed general superintendent, Indiana Harbor Works of **Inland Steel Co.,** Chicago. **Howard Bradley** resigned as superintendent of Inland's sheet mill and galvanizing department and is succeeded by **Leonard C. Pietsch. John G. Rothfuss** remains as assistant superintendent of the department, and **Robert W. Rost** will also serve as assistant superintendent under Mr. Pietsch. **Earl A. Tanner** resigned as a director of Inland Steel Co., and as president and director of Inland Steel Products Co., Milwaukee, and Inland Steel Container Co., Chicago.

—o—

Arthur Keating was elected president, **National Enameling & Stamping Co.,** Milwaukee. The company accepted resignations of **Stevens A. Bennett** as president and director,

TINNERMAN
Speed Nut
SAVINGS STORIES

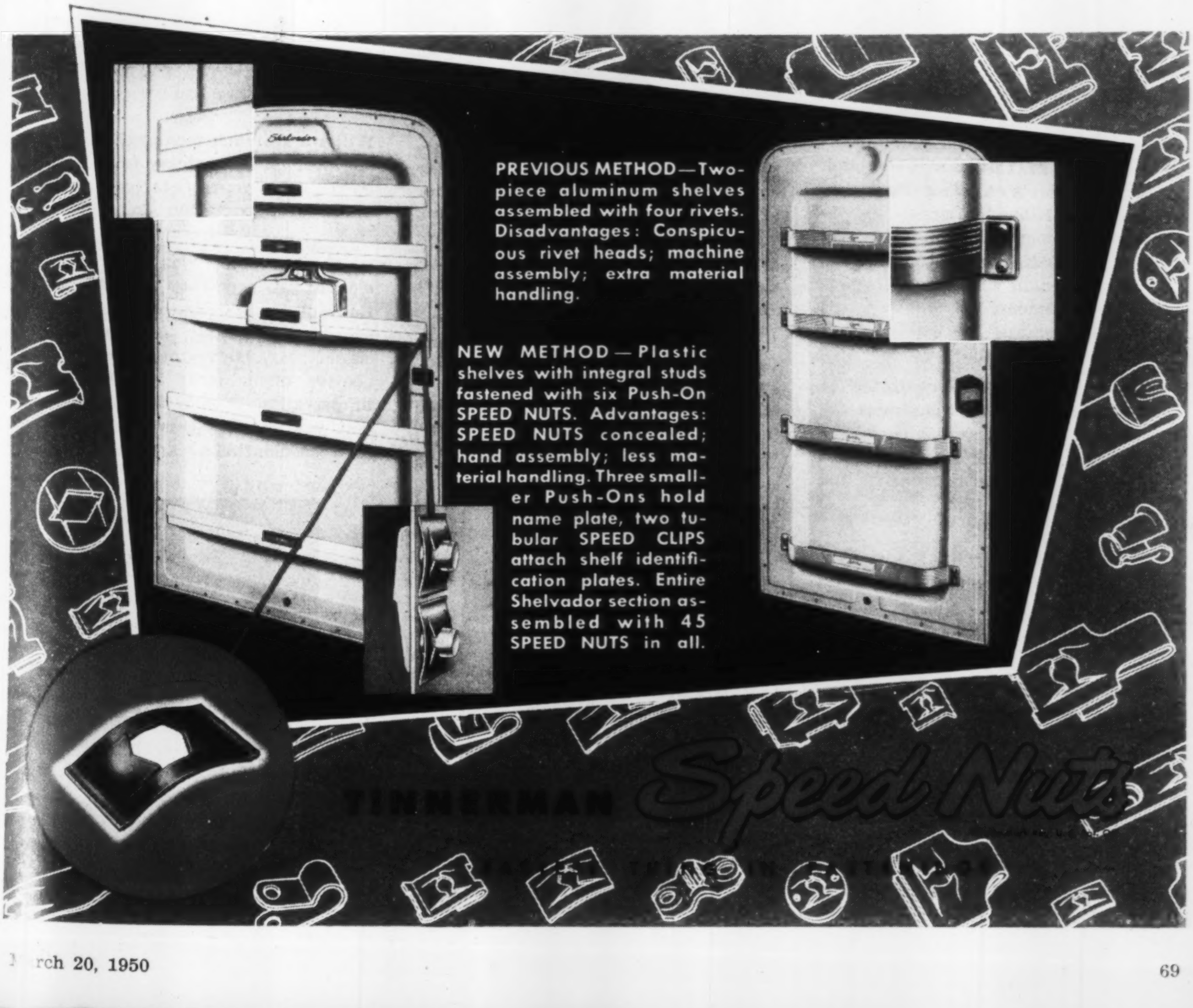
How CROSLEY "Traded-In" *Speed Nut Savings* for Better Shelvador® Design

The 1950 Shelvador has been dressed up for even greater "buy-appeal" in 1950.

Crosley Division of AVCO Manufacturing Corporation has replaced riveted aluminum shelves with streamlined, gleaming plastic attached with Push-On SPEED NUTS—at no extra cost!

The assembly is now done by hand rather than machine, and the higher unit cost of the improved shelves is completely offset by a *49 percent SPEED NUT savings.*

You, too, can capitalize on savings from SPEED NUT brand fasteners. Ask your Tinnerman representative for details. Also write for booklet, "SPEED NUT Savings Stories". Tinnerman Products, Inc., 2040 Fulton Road, Cleveland 13, O. In Canada: Dominion Fasteners Limited, Hamilton.



PREVIOUS METHOD—Two-piece aluminum shelves assembled with four rivets. Disadvantages: Conspicuous rivet heads; machine assembly; extra material handling.

NEW METHOD—Plastic shelves with integral studs fastened with six Push-On SPEED NUTS. Advantages: SPEED NUTS concealed; hand assembly; less material handling. Three smaller Push-Ons hold name plate, two tubular SPEED CLIPS attach shelf identification plates. Entire Shelvador section assembled with 45 SPEED NUTS in all.

and **John W. Cavanaugh, William H. Saunders Jr.,** and **John N. Marshall** as directors. Vacancies on the board created by these resignations and the earlier resignation of **Col. John Slezak** were filled by election of **Francis W. Magin,** president, Square D Co., Detroit; **Anthony von Wening,** vice president, A. O. Smith Corp., Milwaukee; **David G. Baird,** financial consultant, New York; **David Graham,** Chicago attorney; and **Cornelius Ross,** New York insurance executive.

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Otto G. Schwenk was elected to the board of directors, **Yale & Towne Mfg. Co.,** New York, to succeed the late **F. Carroll Taylor.**

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Quaker Rubber Corp., Philadelphia, division, H. K. Porter Co. Inc., has opened a new stock carrying branch at 311 First Ave., Pittsburgh, under direction of **H. M. Sossaman,** who was assistant general sales manager of Quaker.

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Eugene G. Sheasby was appointed assistant district manager for the Pittsburgh district of **United States Steel Supply Co.,** warehousing subsidiary, U. S. Steel Corp. He will assume his new duties Apr. 1.

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Iron Fireman Corp., Cleveland, subsidiary, Iron Fireman Mfg. Co., promoted to newly created sales positions **Howard M. Cutshaw,** Cleveland, to domestic division sales manager; **Stewart H. Kibbe,** Minneapolis, to industrial division sales manager, and **C. D. Carter,** Cleveland, to assistant sales manager in charge of organization development.

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Robert H. Brown, chief of chemical metallurgy, research laboratories in New Kensington, Pa., **Aluminum Co. of America,** Pittsburgh, has been chosen by the National Association of Corrosion Engineers to receive the Whitney Award for 1950.

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Plibrico Jointless Firebrick Co., Chicago, appointed **Robert P. Ranahan** manager of Plibrico Sales & Service Co., Springfield, Mass. He replaces **Julius L. Gottsche,** recently retired.

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Max I. Alimansky was appointed assistant manager of engineering, transformer and allied product divisions, Pittsfield, Mass., for **General Electric Co.** He has been assistant to **K. B. McEachron,** manager of engineering for the divisions. **Richard G. Lorraine** was appointed head of a new project in the Knolls Atomic Power Laboratory, operated for the Atomic Energy Commission, as part of the GE research laboratory, Schenectady, N. Y. **James H. Alderman** was named district representative, construction materials department, Bridgeport, Conn., assigned to the north central district with home office in Indianapolis.

—o—

R. E. Montgomery was named manager, original equipment sales on off-the-road, heavy duty truck and all types of industrial tires for **B. F. Goodrich Co.,** Akron. He is succeeded as Cleveland district manager by **J. D. Roarty,** former manager, San Francisco district, now consolidated with Los Angeles district. **E. C. Shingleton** was transferred from Akron offices to Milwaukee as district sales representative.

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Carl O. Roeder was named southern district manager, with headquarters in Birmingham, for **Brooks Oil Co.**

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Ingram-Richardson Mfg. Co., Beaver Falls, Pa., elected **L. W. Ingram** as chairman of the board of directors, and **H. McE. Patton** as executive vice president. Officers re-elected include **J. F. Ingram,** president; **J. H. F. McMillan,** vice president-sales; **Wm. J. Tress,** secretary and treasurer; **D. L. Brooks,** assistant secretary, assistant treasurer and controller. **E. E. Reagle** was elected president Ing Rich Metal Products Co., E. Palestine, O., succeeding **J. F. Ingram,** who becomes chairman of the board. Other officers elected are **L. W. Ingram,** vice president; **D. L. Brooks,** secretary and treasurer; **F. B. Reese,** assistant secretary, assistant treasurer and controller.

—o—

George F. Jenkins was appointed sales manager, **National Screw & Mfg. Co.,** Cleveland. He has been industrial sales manager since 1948. He succeeds, in active sales direction, **B. H. Jones,** vice president of sales, who under that title will continue in advisory capacity in sales activities of National, its California subsidiary, and divisions including Hodell Chain Co., Cleveland, and Chester Hoist Division, Lisbon, O.

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Louis E. Tallman, associated with the plastics technical service, **Dow Chemical Co.,** Midland, Mich., was appointed technical service representative on the West Coast.

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Leslie Bushfield was named general sales manager, **Perfection Stove Co.,** Cleveland. For the last year he was sales manager, range and heater division. **Herbert C. Erhard,** who headed the Acorn-Oriole sales division, succeeds Mr. Bushfield.

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Stephen A. Ceruti was appointed assistant western division sales manager for **Apex Electrical Mfg. Co.,** Cleveland. He joined Apex in 1937 in the accounting department, and was named office manager of the San Francisco branch office in 1947.

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Edward V. Hegg was appointed sales manager, and **Edward B. Seligmann** division purchasing agent of **Buflovak Equipment Division,** Blaw-Knox Co., Buffalo.

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William Darrach was appointed sales engineer, **J. M. Barclay Inc.,** Newark, N. J., sales representative for Automatic Transportation Co., Chicago.

—o—

P. D. Hermann was appointed executive secretary of **Associated Equipment Distributors,** Chicago, succeeding **Frank G. Knight,** resigned. Mr. Hermann joined the executive office staff in 1948 as administrative assistant. During the last year he has served as editor of the association's official monthly

GEORGE F. JENKINS

P. D. HERMANN

publication, *Construction Equipment News*.

THOMAS E. LLOYD

Thomas E. Lloyd was appointed manager of publications, **American Institute of Mining & Metallurgical Engineers,** New York. He succeeds **T. W. Lippert**, recently resigned to accept the position of general manager of the newly formed Titanium Metals Corp. of America, owned jointly by Allegheny Ludlum Steel Corp. and National Lead Co. (see STEEL, Mar. 6 issue, p. 52). For the last ten years Mr. Lloyd held editorial positions with *Iron Age*.

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A. Stanley Hobbs was appointed as a salesman in the Syracuse, N. Y., office of **Westinghouse Electric Corp.**

—o—

Hypressure Jenny Division, **Homestead Valve Mfg. Co.,** Coraopolis, Pa., appointed **F. A. Rueter** and **J. W. Westhead** as field sales managers for the central and eastern divisions, respectively. They will serve as coordinators between factory and factory representatives in their divisions.

T. W. LIPPERT

George Swan, former president, Swan Inc., specialists in pipe and tube forming, has joined **Murray Tube Works Inc.,** tube fabricating affiliate of A . B. Murray Co. Inc.

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Phil Norton, general sales manager, **Wisconsin Motor Corp.,** Milwaukee, was appointed a vice president. He has been connected with the company in a sales capacity for more than 20 years.

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J. V. Naish, director of contracts, has been given the added assignment of director of sales for **Consolidated Vultee Aircraft Corp.,** San Diego, Calif. **J. G. Zevely** was appointed manager of contracts for the San Diego division.

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J. T. Cavnar was named car sales manager for **Ford Motor Co.'s** western division. He formerly was manager of the parts and accessories department for the western region.

R. O. BRIDGE

R. O. Bridge was appointed purchasing agent, and **C. C. Kennedy** as assistant purchasing agent, **Crucible Steel Co. of America,** Pittsburgh. Both are stationed in Pittsburgh.

—o—

R. A. Ferber was appointed Baltimore district contracting manager, **American Bridge Co.,** succeeding **J. W. Small III** who became affiliated with a newly organized general contracting company, Laird, Rock & Small Inc. Mr. Ferber formerly was associated with the New York office of American Bridge Co. **W. R. Moore Jr.** is assistant Baltimore district manager.

—o—

Paul J. Bracken was appointed manager, Philadelphia branch sales office, **National Radiator Co.,** and **Henry F. White** was promoted to manager, Boston branch sales office, succeeding Mr. Bracken.

OBITUARIES . . .

W. F. Rummell, 58, vice president of sales, **Thomas Steel Co.,** Warren, O., died Mar. 10. He had been associated with the company 25 years.

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Gerald D. Stone, 52, manager, process service, central division at Chicago, **Linde Air Products Co.,** a unit of Union Carbide & Carbon Corp., died Mar. 4. He had been associated with the company 29 years.

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Jeremiah R. Van Brunt, 82, vice president and director, **Chase Brass & Copper Co.,** New York, died Mar. 13 at his home, Kitchawan, N. Y.

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Robert M. Lippard, associated with the **Heald Machine Co.** for over 27 years, died Feb. 19. He was branch manager of the Cleveland office and later held the same position in Detroit. For the last 12 years he was foreign sales manager of the company, and also supervised domestic dealerships.

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Lancaster P. Clark, founder and chairman of the board of directors, **Clark Metal Products Inc.,** Bridgeport, Conn., died recently.

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George A. Rohner, secretary and treasurer, **Burger Iron Co.,** Akron, died recently.

—o—

Arthur E. Gibbs, 74, electrochemist and inventor with **Pennsylvania Salt Mfg. Co.,** Philadelphia, died Mar. 2. He organized the first separate research and development department of Pennsalt in 1908. He continued as head of this activity, and later as advisory technical director until his retirement in 1946.

—o—

Ernest A. Bowman, 61, superintendent of blast furnaces, **Hanna Furnace Corp.,** Buffalo, died Mar. 9.

—o—

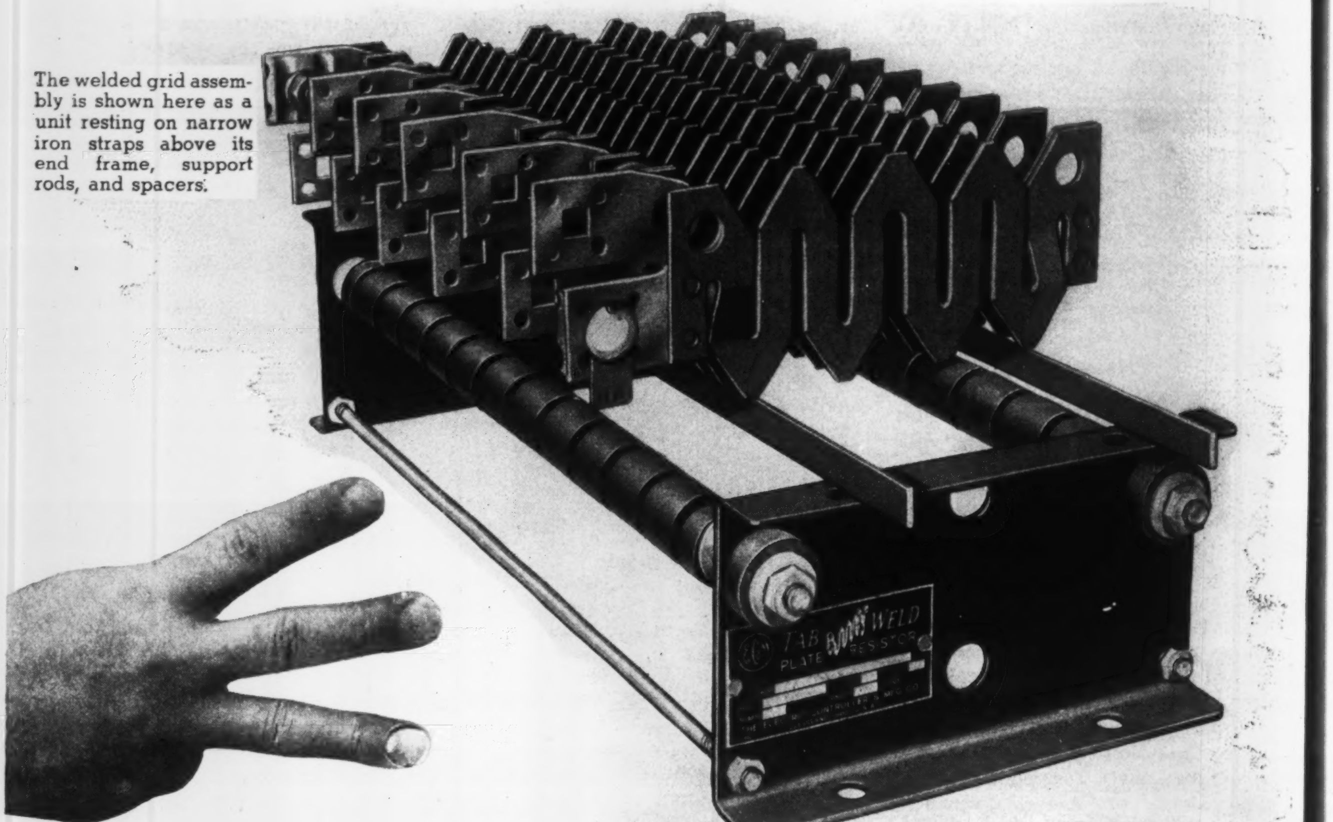
Frank L. Scott, 60, owner, **Lloyd & Scott Brass Foundry,** Wilmington, Del., died Mar. 6.

—o—

W. G. Hooper, 69, vice president, **Midwest Piping & Supply Co. Inc.,** St. Louis, died Mar. 11.

—o—

Arthur J. Herschmann, 76, export manager for **Parker-Kalon Corp.,** New York, died recently.



The welded grid assembly is shown here as a unit resting on narrow iron straps above its end frame, support rods, and spacers.

Steps Up RESISTOR Performance these 3 ways

TAB-WELD Resistors as part of Factory-assembled Control for recent Ore-Bridge Installation.

The *welded* grid-assembly of the EC&M TAB-WELD Plate Resistor reduces resistor maintenance costs and improves operation.

HERE'S HOW:

1. **Stabilizes** the Ohmic Value—A continuous path for current is maintained *independent* of the clamping-nuts.
2. **Stops burning** at grid-eyes and at tap-plates. Trouble is eliminated in these concealed areas due to *intimate* contact maintained by welding.
3. **Simplifies** Tap-Shifting—(a) when adjusting resistance to improve motor operation on an existing installation; (b) when necessary to replace a section, a standard mill section can be taken from the storeroom and used *without change* . . . External connections can be made to any one of the several tap-plates; only the external lead and terminal block need be moved to give the desired operation.

For low-cost, trouble-free operation, make up resistor layouts with EC&M Bulletin 942 TAB-WELD Plate Resistor Sections, made from corrosion-resistant steel.

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET • CLEVELAND 4, OHIO

Production AND Engineering
NEWS AT A GLANCE

FASTER METAL REMOVAL— Faster, less costly operations on nonferrous metals and plastics commonly performed by grinding are possible with a disk file developed by Kennametal Inc., Latrobe, Pa. Material is removed in sizable chips by a multiplicity of sharp cutting edges shaped and positioned on the disk to provide a 30° negative axial rake, 30° clearance angle and 10° negative radial rake. The company states that eccentricity of the intermediate courses of the triangular prisms brazed to the face of the steel back-up plate assures uniform cutting action across the face of the work. Work also remains cooler because heat of cutting is dissipated by the chips.

LUBRICATES AUTOMATICALLY— An improved method of lubricating the rolling key clutch of inclinable presses, developed by E. W. Bliss Co., Toledo, O., makes it necessary to oil the bearing only after each 40 hours of operation. The so-called oilless bearings now employed by the company are said to retain oil within their porous structures which, after reaching operating temperature, cause the oil to expand and completely lubricate the working surfaces of the clutch. The bearings are interchangeable with bronze bushings previously employed.

SYNTHETIC MICA— Successful crystallization of synthetic mica with essentially the same properties as natural mica at the National Bureau of Standards may eventually mean that the United States may be entirely self-sufficient in high-grade mica insulating materials. Mica's remarkable properties as an electric insulator makes it invaluable to electrical and electronic industries. Although the U. S. is the world's largest consumer of natural mica, it produces only enough to meet a third of its requirements. Thus successful control of crystal orientation in the growth of synthetic mica—on which experiments are now in progress—would mean that machine methods could be employed for large-scale domestic production of sheet mica.

"STRONGBACK" WITH PURPOSE— A strongback which lifts mold flasks weighing up to a ton, designed by a molder at Long Beach Naval Shipyard, is reported to save several steps in turning the flasks. According to the Department of Defense, it consists of an 8-foot inverted T-bar from which two chain loops are suspended. The bar is serrated on its upper edge to hold flasks of several sizes. A U-shaped handle at each end of the flask flips it over while supported in the loops. Lifting is done by means of a V-bar welded to the center of the strongback.

EFFICIENCY WITHOUT SKILL— Drilling, chamfering and reaming of automotive flywheels at the rate of 140 pieces per hour at 100 per cent efficiency is standard procedure for the latest machine developed by Cross Co., Detroit. Furthermore work can be turned out without services of a skilled operator. The unit is a five-station index trunnion type machine equipped with a fluid motor for indexing. At the first station, the attendant loads and unloads. Sixteen holes are drilled at the second station and chamfered at the third station. At the fourth station 15 holes are chamfered, three being reamed at the fifth. Standard subassemblies can be employed to provide flexibility for reasonable part design changes.

EASIER METAL FLOW—Rapid radiant gas method of heating steel for forging provides easier metal flow resulting in 23 per cent deeper penetration in the metal according to recent laboratory investigations conducted by Selas Corp. of America, Philadelphia. Besides reducing scale and decarburization, the fast heating technique offers an additional benefit. It minimizes and, in some cases, eliminates the occurrence of subsurface oxides. (p. 76)

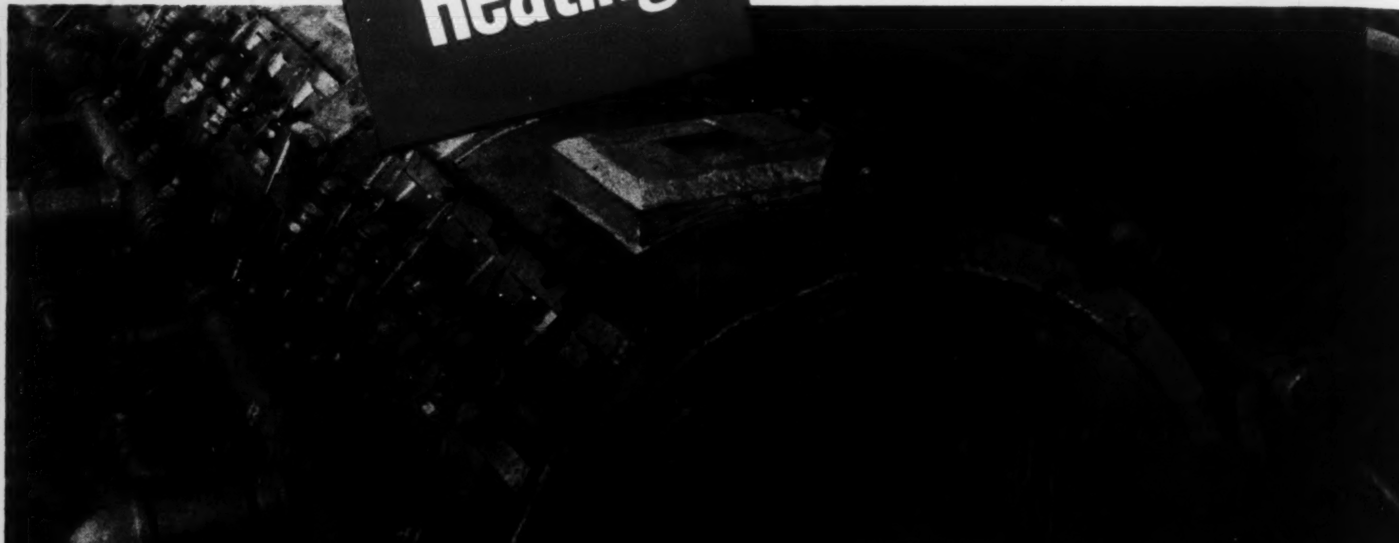
LOWER COST SPRINGS—Compared with various types of automotive leaf springs now in use, the three-leaf "broadbeam" spring developed by Spring Perch Co., Lackawanna, N. Y., provides identical or better mechanical features even though manufactured at considerably less cost. Elimination of materials in this case did not affect performance. Investigations showed the entire range of auto springs currently fall within rates of 90 to 155 pounds per square inch to carry loads of 700 to 1400 pounds. The new spring with minimum length of 52 inches covers this entire range with a weight saving up to 25 per cent, and an estimated 15 per cent higher fatigue life than the standard. (p. 80)

PIN POINTS ERRORS—Instrument recordings save much labor because they eliminate intermittent checking and provide easy interpretations. Same principle now is being used in the inspection of machined parts. Particularly in the gear industry, it is proving useful in checking gears and other complex parts. Graphic inspection, as the method is termed, saves inspection time, reveals true condition of the inspected surface much more accurately than figures. (p. 85)

180-DEGREE "SQUEEZE" — Although forging rolls are not used in forging plants to the extent hammers or presses are employed, they are important for producing forgings where sections must be drawn out to long thin sectional areas. Waldemar Naujoks, in his second discussion on the subject, points out the rolls are similar in appearance to bar rolls used in steel rolling mills. They differ in that they are actually only half rolls, or have rolling surfaces for 180 degrees and blank space for the remainder of the revolution. (p. 91)

Fast Heating

IMPROVES F



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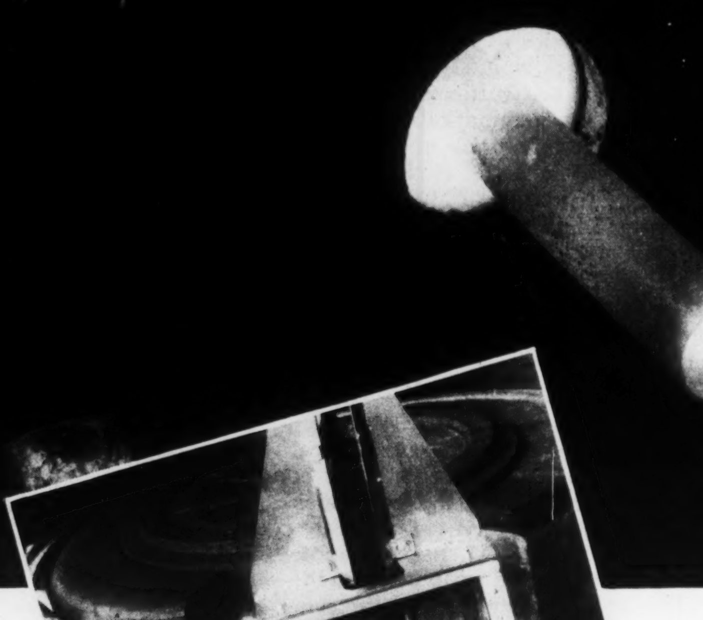
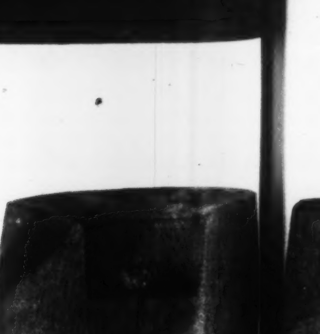


Fig. 1—Discharge end of line of 13 units reheating seamless steel tubing for final sizing

Fig. 2—The rotary hearth furnace, with automatic charging and discharging, for rapid heating of steel blanks up to the forging temperature



By CHARLES A. TURNER Jr.
Metallurgist
Selas Corp. of America
Philadelphia

S FORGEABILITY

Easier metal flow, resulting in 23 per cent deeper penetrations in steel heated rapidly by the radiant gas method, is one of the unexpected results obtained from recent laboratory investigations. Reduced scale and decarburization are among the other benefits

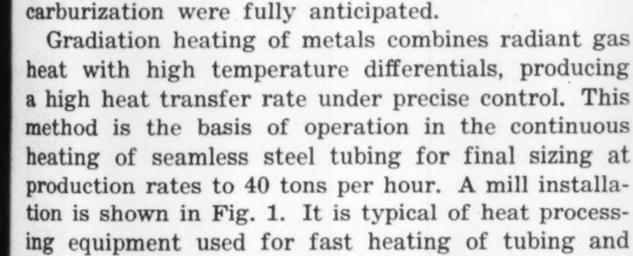
RAPIDLY heated steel, brought to forging temperature, can be penetrated 23 per cent deeper than with the same load application on identical steel heated to the same temperature at the conventional slower rates. This was ascertained in recent laboratory investigations evaluating the experiences and results obtained from equipment incorporating the gradiation method for fast heating of steel for forging.

The rapid heat processing method was found to be producing an unexpected result: Easier metal flow that seems to account for the deeper penetration. Metallurgical improvements of reduced scale and decarburization were fully anticipated.

Gradiation heating of metals combines radiant gas heat with high temperature differentials, producing a high heat transfer rate under precise control. This method is the basis of operation in the continuous heating of seamless steel tubing for final sizing at production rates to 40 tons per hour. A mill installation is shown in Fig. 1. It is typical of heat processing equipment used for fast heating of tubing and billets for sizing, for rolling, piercing or forging. Another automatic machine, Fig. 2, has a rotary hearth for heating small blanks at high production rates.

Force required to deform metal above its critical temperature is belived to be determined largely by the temperature of the metal. In addition to temperature, viscosity or internal friction is another variable affecting resistance to deformation. The effect of viscosity is apparent in noting that resistance to deformation is a direct function of the rate of deformation, or strain rate. Hot metals, kept at a constant temperature, can be deformed by least pressure and with least work if the unit deformation takes place very slowly. However, during slow deformation the metal cools and resistance to deformation increases. If the metal is deformed at a faster rate to prevent this cooling, the resistance to deformation is greater due to the viscosity effect.

Fig. 3—Influence of heating time and composition on penetration of steel slugs at 2100°F. (A) AISI 52100, slow heating and soak; (B) AISI 1040, slow heating and soak; (C) AISI 1040, fast heating



In heating for forging, a balance is sought between low resistance due to slow deformation and low resistance due to high temperature. The advantage of fast heating in providing improved forgeability lies in the resulting lower resistance to deformation for a given strain rate. The internal friction of fast-heated steel is less than that of slow-heated steel. To account for this lower resistance it is necessary to consider some fundamental concepts relating to forge heating.

Concepts of Forge Heating—At ordinary temperatures the grain boundaries are generally believed to be much stronger than the crystals so that deformation and fracture occur within the crystals. Above the critical temperature, this relationship is reversed and the boundaries yield more readily than the mass of the crystal. Thus, any condition which promotes a buildup of internal friction in the grain boundaries will increase the resistance to deformation.

Such a detrimental condition relates to the oxidizing effects of the combustion products in all forge heating. One result, noticeable in all grades of steels, is decarburization. Carbon, as well as silicon, chromium, nickel, copper and other elements that have a greater affinity for oxygen than iron, is oxidized before the iron. Carbon migrates toward the surface, forms CO and CO_2 and escapes, but at a much slower rate than oxygen penetrates. The other elements, including iron itself, remain as oxides, usually concentrated at the grain boundaries. This oxidation begins at the lowest scale-forming temperature and continues more rapidly as the temperature rises to about 2000° F, at which point the intergranular penetration of the oxides extends to considerable depths.

Potent Factors—It appeared logical to theorize that with slow heating rates and soaking at peak temperatures the intergranular oxides form and increase the internal friction which, in turn, increases the resistance to deformation. Time, temperature and atmosphere are the potent factors affecting the rate and degree of oxygen penetration. Since temperature and atmosphere provide little or no flexibility, being pre-established by other conditions, the time factor becomes all important.

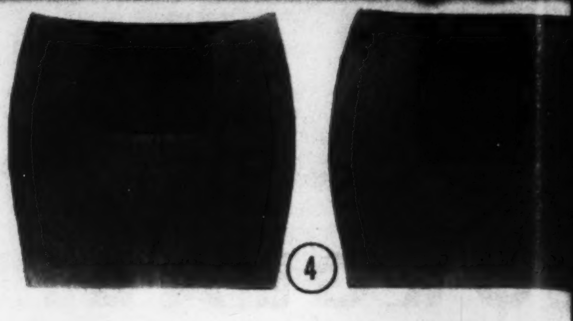
To establish the importance of the time factor, an investigation was made to show that, under fixed conditions of steel composition, as well as temperature and furnace atmosphere, hot plasticity is a function of the time the steel is exposed to heat. In other words, the shorter the heating time the greater the metal flow.

The test method was developed along the lines of a hardness test, involving a standard penetrator impressed upon the test piece by a standard load, with the depth of penetration being the measurable variable. The load application was made by utilizing a hydraulic press. The press ram carried a tungsten carbide penetrator having a flat contacting face of slightly less than 1 inch diameter, and tapered to a larger diameter over its length. Load on this penetrator was equivalent to approximately 2000 psi and was applied through electronic timer control for exactly 2 seconds in each test. The action in this test is comparable with one combining both pressing and piercing in a forging operation.

Steels tested were AISI 1040 and AISI 52100 slugs, 2⅛-inch diameter by 2½ inches long. Heating was done in the furnace chamber adjacent to the press.

Slow and Fast Heating—Slow heating, representative of conventional methods, was obtained by charging the slug with the furnace stabilized at the peak slug temperature. After reaching peak temperature in approximately 10 minutes, the slug was soaked for 30 minutes. Temperature control of furnace and slug was obtained by checking with optical pyrometer.

Fast heating was obtained by stabilizing the furnace at 2600° F, charging the slug for a fixed period to reach the desired temperature, and removing for transfer to the press. Time for heating the slug to peak temperature was initially determined by a test run with a slug in which a thermocouple was located at the center, 1½ inches below the top face. The thermocouple was attached to a direct reading pyrometer. About 75 slugs were heated under varying conditions of time, temperature and atmosphere. The tops of all slugs used in these penetration tests were covered during the heating cycle to prevent scale formation on the surfaces of the slugs to which the penetrator was to be applied.



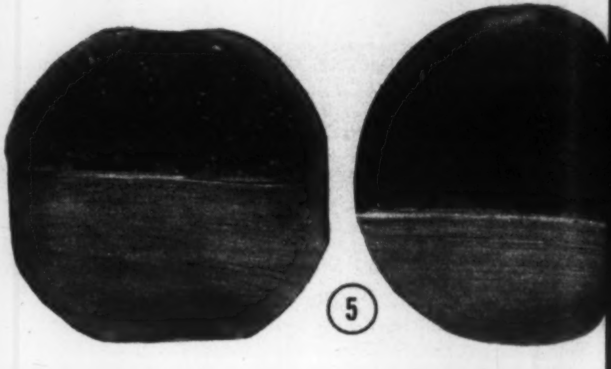


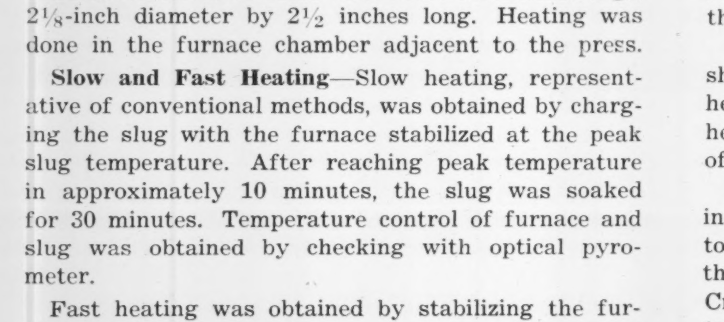
Fig. 4—Influence of the heating time on penetration of AISI 52100 steel slugs at 2200° F. (A) Slow heating and soak; (B) fast heating

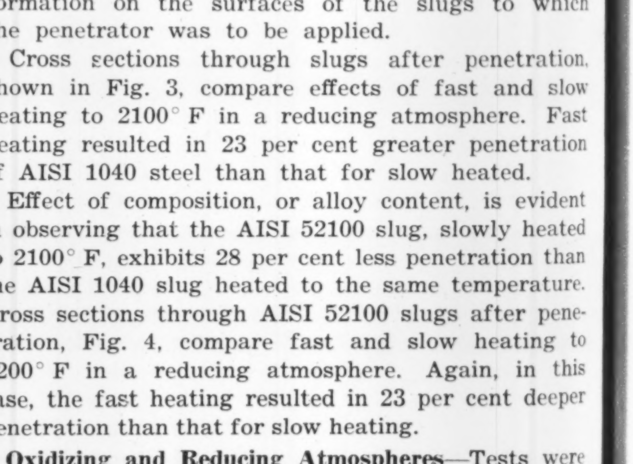
Fig. 5—Influence of atmosphere on facet formation in AISI 4340 1⅝-inch bar after slow heating and soak at 2350°. Left, oxidizing atmosphere; right, hydrogen

Cross sections through slugs after penetration, shown in Fig. 3, compare effects of fast and slow heating to 2100° F in a reducing atmosphere. Fast heating resulted in 23 per cent greater penetration of AISI 1040 steel than that for slow heated.

Effect of composition, or alloy content, is evident in observing that the AISI 52100 slug, slowly heated to 2100° F, exhibits 28 per cent less penetration than the AISI 1040 slug heated to the same temperature. Cross sections through AISI 52100 slugs after penetration, Fig. 4, compare fast and slow heating to 2200° F in a reducing atmosphere. Again, in this case, the fast heating resulted in 23 per cent deeper penetration than that for slow heating.

Oxidizing and Reducing Atmospheres—Tests were made with heating carried out in oxidizing and reducing atmospheres. Since no appreciable, or consistent, difference in results was observed it is assumed that oxygen in the furnace gases, free or combined, is equally detrimental. The important conclusion is that the only way to void its influence effectively





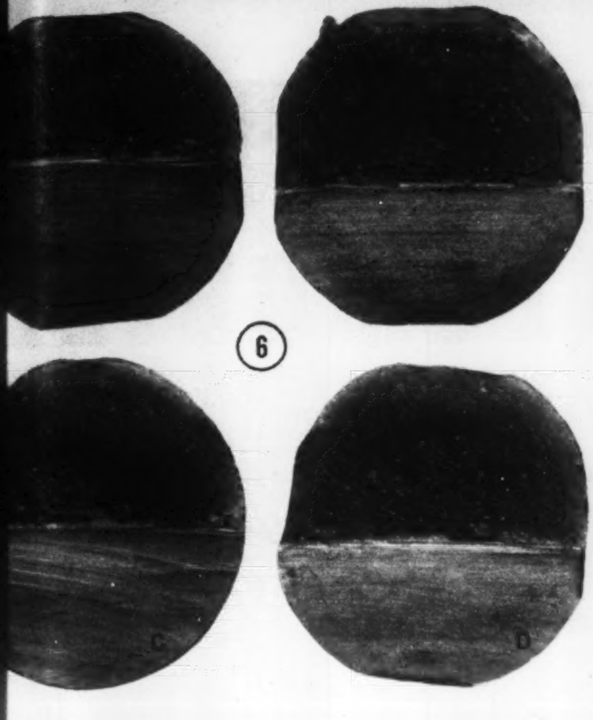


Fig. 6—Influence of atmosphere and temperature on facet formation in AISI 4340 bar, 1⅝-inch diameter, after slow heating and soaking. (A) 2350°F, oxidizing atmosphere; (B) 2350°F, reducing atmosphere; (C) 2250°F, oxidizing atmosphere; (D) 2250°F, reducing atmosphere

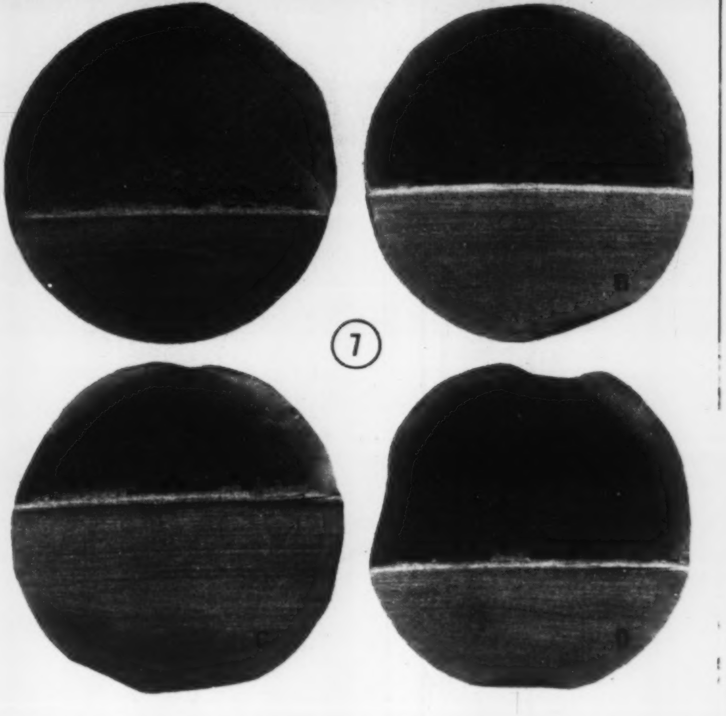


Fig. 7—Influence of atmosphere and temperature on facet formation in AISI 4340 bar, 1⅝-inch diameter, after fast heating. (A) 2350°F, oxidizing atmosphere; (B) 2350°F, reducing atmosphere; (C) 2250°F, oxidizing and (D) 2250°F, reducing atmosphere

is to shorten the length of time that it is exposed to heat.

A manifestation of oxygen penetration, and intergranular oxides, is believed to be the appearance of large grayish grains, "facets," against the normal entirely fibrous fracture of fully treated alloy steel, that has been slow heated and soaked in an atmosphere containing free or combined oxygen.

Facet Condition—The subject of facets has been dealt with by Strohm and Jominy[1]. A similar article was written by H. J. Merchant[2]. Both articles indicate that during World War II many forgings, particularly for aircraft, found to be substandard in room temperature tensile and impact tests, showed the facets upon fracture.

They attribute the facet condition to overheating (the use of excessively high temperatures in heating for forging) because it could be most readily reproduced experimentally by heating the steel above the maximum recommended forging temperature. However, in discussions of both papers, some forge men noted that there were occurrences of facets in forging heated to normal

(*Please turn to Page* 103)

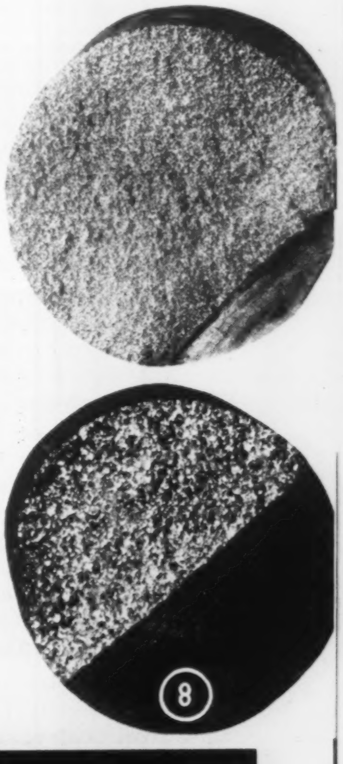
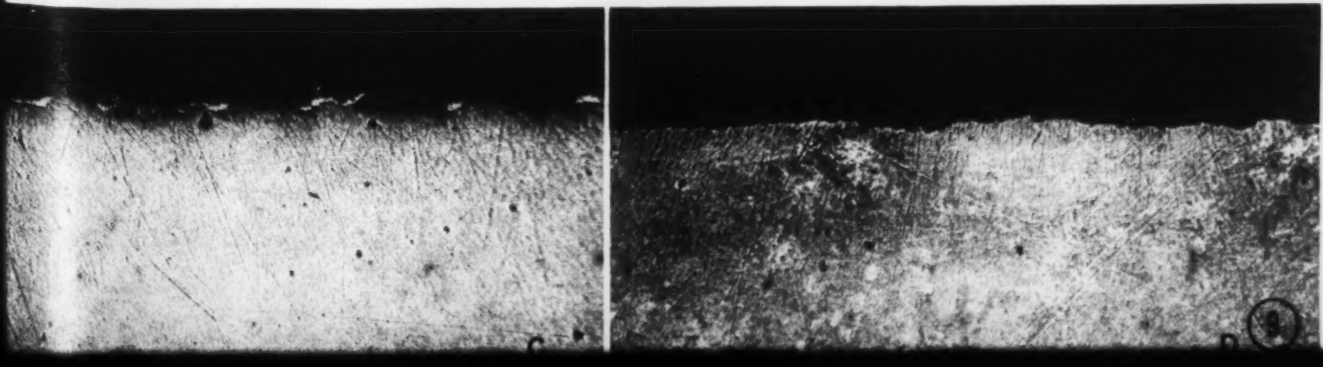
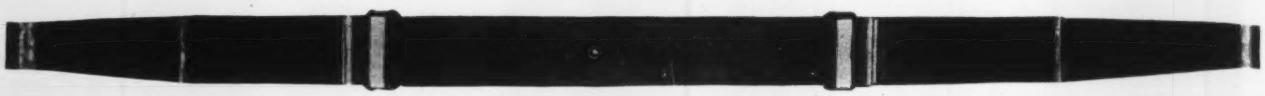


Fig. 8—The influence of heating time on grain size of AISI 52100 steel heated to 2100°F. Above, fast heating; below, slow heating and soak

Fig. 9—Influence of the heating time and atmosphere on subsurface oxygen concentration and oxide formation in AISI 4340 bar, 1⅝-inch diameter, heated to 2350°F. Alkaline dichromate etch. (A) Slow heating and soak, oxidizing atmosphere, 100X; (B) slow heating and soak, oxidizing atmosphere, 400X; (C) fast heating, oxidizing atmosphere, 100X; (D) slow heating and soak, hydrogen atmosphere, 100X





Three-Leaf AUTOMOBILE

New "broadbeam" unit, designed primarily for passenger car use, requires less labor in fabrication and assembly, has excellent mechanical features

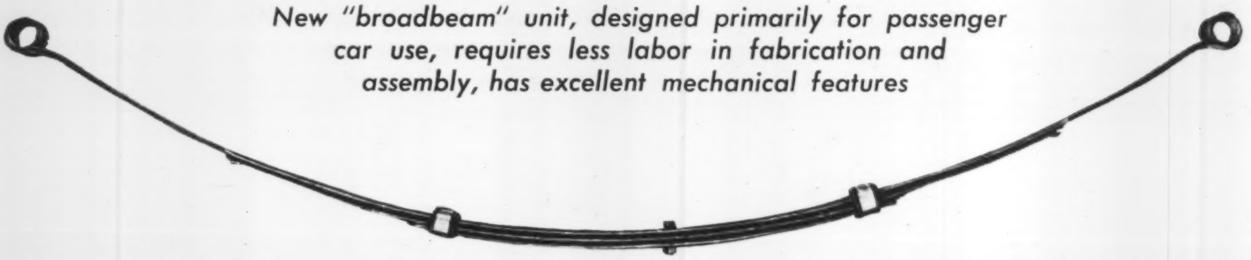


Fig. 1—Two views of three-leaf spring with characteristics equivalent to or better than a conventional eight-leaf design of the same size. Note leaves are wider, although main leaf tapers at ends to standard eye size. Intermediate and short leaves are taper-rolled at the ends to approximate uniform beam stress-strain pattern

MAJOR elements of cost in the manufacture of conventional types of leaf springs, such as the eight-leaf longitudinal units used by many types of passenger cars and trucks, are labor and material. In studying ways and means to reduce costs what could have been more natural for spring manufacturers than to develop a spring with fewer leaves, requiring less labor in fabrication and assembly, and considerably less steel?

Simple as this sounds, there were many problems encountered, not the least of which was the realization of equal or improved mechanical features and strength. Careful consideration had to be given to many factors—weight, fatigue life, transverse stability, brake wind-up, load-carrying capacity, rate, dimensions and types of fittings, to name a few.

"Broadbeam" Spring—For several years, engineers of Spring Perch Co., Lackawanna, N. Y., have been pursuing such a study. They now have come up with a three-leaf "broadbeam" spring, primarily for passenger car use, which can be manufactured at considerably lower cost and at the same time provides identical or better mechanical features when compared with the various types of leaf springs now in general use. Their research covered single and multiple-leaf springs, including up to ten leaves. The three-leaf design was determined to be best suited to meet present-day conditions from both psychological and practical viewpoints. By "psychological" is meant a design which would not be too much at variance with what the customer has by habit become used to. This is believed to be the principal stumbling block in the way to general adoption of the lighter spring, engineers simply refusing to believe its equivalent properties.

Investigations showed the entire range of passenger car springs currently fall within rates of 90 to 155 pounds per inch to carry loads of 700 to 1400 pounds per spring. The "broadbeam" spring with minimum length of 52 inches and with varying widths from 2¼ to 3½ inches (conventional eight-leaf springs are 2 inches in width) covers this entire range, with a weight saving of up to 25 per cent and an estimated 15 per cent higher fatigue life than the standard production spring. Standard fittings, such as bushings, bolts, shackles, etc., are used by tapering the ends of the main leaf down to the 2-inch width. Beyond that, this tapering makes the entire spring conform more nearly to a beam of uniform section in its stress-strain pattern, which is the goal of the spring designer.

Length a Constant—Aim of the "broadbeam" spring proponents is to have the length a constant, the number of leaves a constant and to vary the width for varying capacities, the widest being for the heaviest load, and narrowing down as the load decreases.

While the three-leaf spring is manufactured from standard sections of spring steel, readily available from steel mills, its success is dependent upon advanced manufacturing and finishing techniques, the principal ones being an accurate reduction of the section thickness of the two shorter leaves toward their ends by a precision taper rolling process, and the improvement of fatigue properties by precision shot peening, using selected steel shot in the latest types of blasting equipment.

Endless fatigue tests have indicated roughly a 15 per cent improvement in fatigue life of the three-leaf spring in its ultimate development, over the standard eight-leaf type. The wider leaves at the same time have raised transverse stability by as much as 50 per cent, suggesting advantages in the form of greater resistance to sidesway and more level and stable ride. Decreased aggregate thickness of the spring through the center section also may bring advantages in the form of added road clearance, while the lighter weight cuts down on unsprung weight of the vehicle, always a desirable end.

Standard Tests—A standard type of leaf spring test is to measure what is called "brake wind-up".

SPRING

. . built at less cost

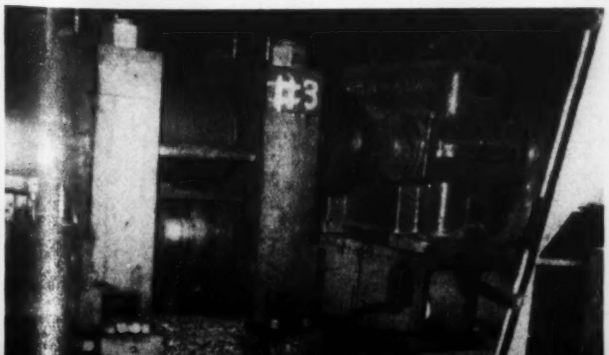
By A. H. ALLEN
Detroit Editor, STEEL

In this test the spring is anchored at the ends and at the center while an upward force is applied about one-third of the way from the center to the end, resulting in a reverse bending of the leaves. The three-leaf design proved the equal of the eight-leaf type in this test, as it did in breakdown tests where the natural arc of the spring is completely reversed beyond anything it would receive in service. This treatment is given all production springs, setting up a new elastic limit and insuring against the spring taking a permanent set.

As manufactured for production, the three-leaf spring is equipped with rebound clips developed by Spring Perch—thin stainless steel strapping wound tightly around a rubber collar over the three leaves, with the ends held firmly by a special seal clip. This is calculated to permit freedom of movement of the leaves but to guard against development of squeaks and rattles. Frictional squeaks and other noises are further minimized by the use of a tough rag paper liner impregnated with a special lubricating wax between each leaf.

Springs Interchangeable—The three-leaf spring is made with the same eye sizes and overall lengths as most present leaf springs, and is interchangeable with them in application to vehicles, excepting where some slight alteration is necessary to accommodate the increased width and decreased overall thickness at the center. A typical 52-inch size has an intermediate leaf 38½ inches (*Please turn to Page* 106)

Fig. 5—New rolling mill capable of taper-rolling up to 18-inch length of spring leaf end



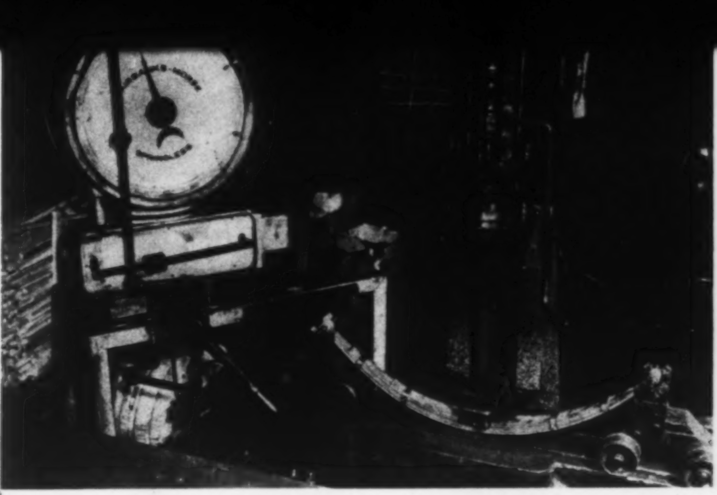


Fig. 2—Reverse bend test on eight-leaf spring, a treatment given all production springs to set up new elastic limit and insure against permanent set. Test on three-leaf spring gives identical results

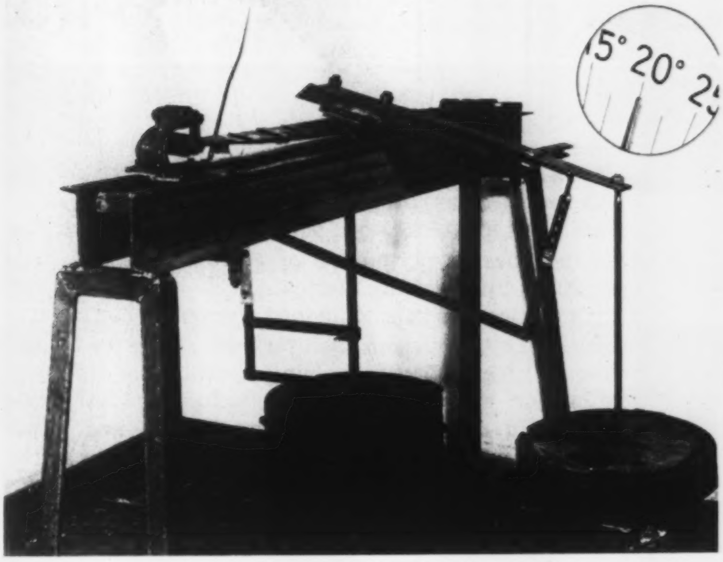


Fig. 3—Transverse or lateral stability test on three-leaf spring, showing arrangement of weights which twist the beam through 20-degree arc. On this particular test, twist given the "broadbeam" spring shows resistance practically 50 per cent better than on the eight-leaf spring

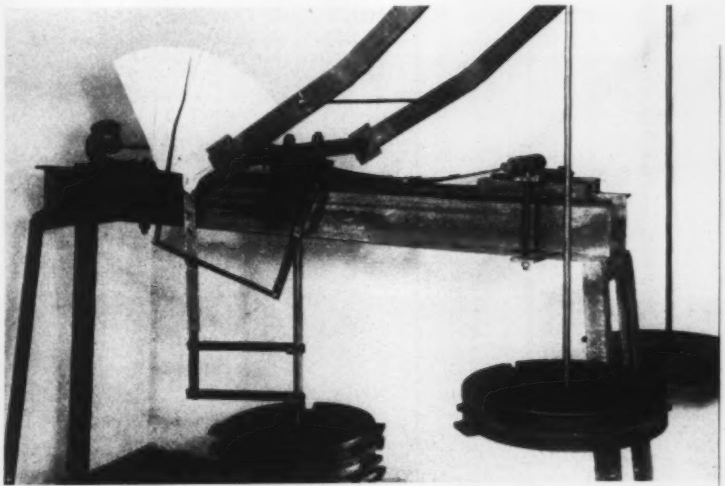


Fig. 4—Under simulated braking conditions, the three-leaf spring is tested for degree of "brake wind-up." Pointer reading is about 11 degrees, same as for the eight-leaf design

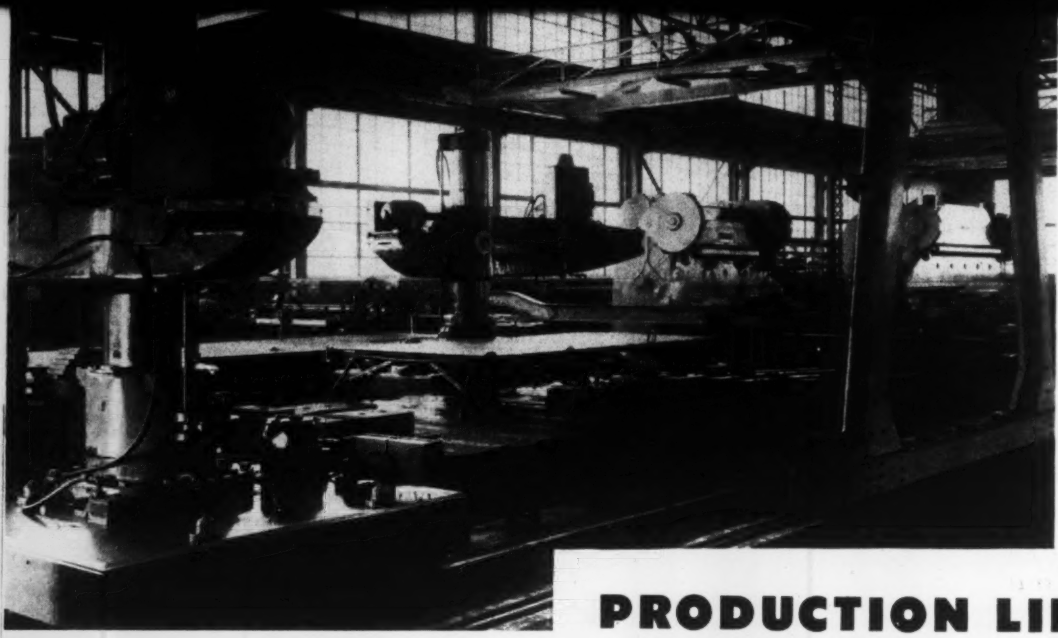


Fig. 1—Equipment in the plate fabricating shop includes radial drills, shears, travograph and press brakes. Flexibility is a major factor here. Note how radial drills are mounted on rails

PRODUCTION LINE METHODS

. . . speed output of heavy equipment

EXCELLENT example of skillful plant layout for the efficient production of heavy machinery is the Cleveland plant of Euclid Road Machinery Co. where welded frames for various models of earthmoving and coal-hauling equipment are fabricated.

Operations start with indoor storage of steel plates which are transferred by overhead cranes to an adjoining area for cutting, shaping, drilling and preparation for welding. Equipment includes radial drills 8 feet in diameter, shears, travograph and press brakes including one of the three largest brakes in the country.

Next, the prepared sections move to the welding department where they are first assembled in fixtures and tack-welded to form subassemblies and complete frames. From the setup area 3 and 5-ton half-gantry cranes move frames to the succeeding stations where they are placed in trunnions to permit positioning for better access to the welded joints and to allow as much downhand welding as possible. Welding is completed under a welding procedure planned to hold warpage to a minimum. After cleaning, frames proceed to a paint booth for a protective priming coat.

Murex Genex M electrodes manufactured by Metal & Thermit Corp., New York, are used in many of the fabricating operations. Some type HTS and Murex Hardex electrodes are employed where alloy steel components are incorporated and where parts require hard surfacing.

Final assembly starts with placing a welded frame on the moving assembly line. Traveling at the rate of 5 inches per minute, the frame acquires springs, axles, transmission, engine, hydraulic equipment, cab, body and other parts, many of which are produced at the company's other two plants. After testing and final mechanical adjustment, the finished unit is ready for painting and shipping.

Euclid Road Machinery builds a well-known line of heavy, diesel driven, earthmoving and coal hauling equipment. Standard models include a 22-ton rear-dump truck, 13 and 25 cubic yard bottom-dumps and a 40-ton coal hauler, as well as loaders and scrapers intended for use in combination with Euclid haulers. Many special jobs are built, such as a 50 cubic yard tandem hauler with diesel driving units front and rear.

Fig. 2—Positioning equipment for welding massive components permits better access to welded joints and allows as much downhand welding as possible

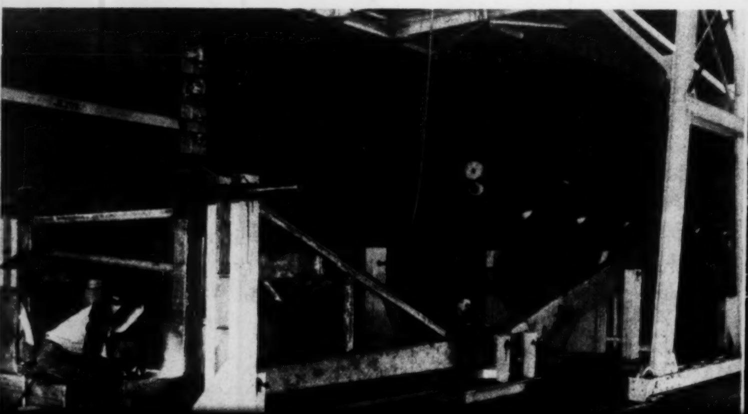
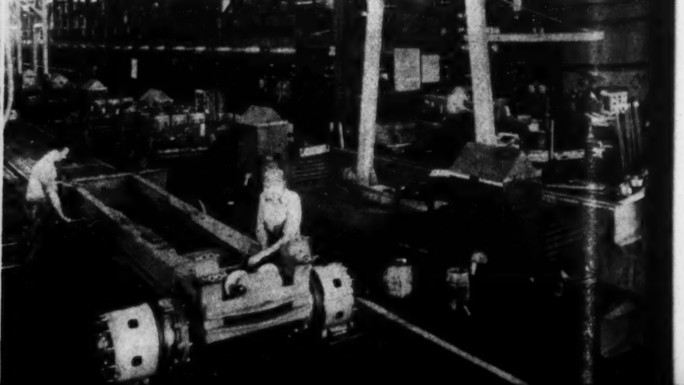


Fig. 3—Final assembly line is serviced by all kinds of materials handling devices including underfloor chain conveyor, gantry cranes, swing cranes, dollies, skid boxes, trucks



SHEET STEEL AND SPUN ALUMINUM

. . . team up with stud-weld design to make petroleum tank vent valves convenient to handle and easy to install

By GEORGE STEWART
Chief Engineer
Johnston & Jennings Co.
Cleveland

GREATLY increased capacity of pumping facilities has necessitated the redesign of the many accessories commonly used with petroleum storage tanks at refineries and tank farms. Increased pressures, larger pipelines and greater attention to proper safety practices have all played their part in the growth and development of vent valves, flame arrestors and similar equipment.

Steady increase in the required minimum capacity of these products has forced manufacturers to alter the design of these accessories to provide the required operational features while keeping size, weight, and other construction factors within practical limits. Typical of these accessories are the Oceco vent valves used on petroleum or gas storage tanks at refineries and tank farms to control tank breathing and minimize vapor loss. Only a few years ago, the most common sizes for these valves were 2, 4 and 6 inches in diameter. Today, 10 and 12-inch valves are commonplace, and there are already indications that these sizes may prove inadequate for future storage systems.

Redesign Essential—In view of the apparent necessity of building even larger vent valves to keep pace with modern pumping and storage systems, redesign of these valves and other similar equipment for certain applications was obviously in order. By constructing these vent valves from fabricated steel shells and a spun aluminum hood, weights are reduced, installation simplified, and manufacturing costs lowered. The new 10-inch valve weighs only 122 pounds, while the 12-inch valve weighs 147 pounds, reflecting an effective weight reduction.

The fabricated shell is formed from 14-gage sheet steel and arc welded into a lightweight assembly which can be moved by hand throughout the shop without the need of cranes or other materials-handling devices. Machining has been completely eliminated by the use of threaded studs and welded to the fabricated valve body. By employing simple locating templates and the Nelson hand-operated stud welding gun, four sizes of studs are welded in place around the perimeter of the valve body, using a single 400-amp welding generator as a source of power.

Screen Fastened—Screen and spun aluminum hood are fastened to the body by female extension rods which are threaded onto six ⅜-inch studs welded to the body. Eight ¼-inch MG studs secure the vacuum valve seat to the valve body, while two ½-inch studs fasten the vacuum cover plate to the top of the valve body.

Specially designed ¾-inch threaded studs with a ½-inch weld base are the fourth type of stud used on the valve body. Since ¾-inch is the conventional thread diameter for securing the vent valve to flame arrestors, this dimension could not be changed. However, welding a ¾-inch stud would require three 400-amp generators in parallel, so the weld base of these studs was reduced to ½-inch. As a result, all the studs welded to the valve require only a single welding generator. Tests have proved that adequate strength is developed in the stud, although the weld base is one-third less than the thread diameter.

Shipping has been simplified and improved, as the valves are now packaged safely in lightweight, easy-to-construct wood boxes. Further advantages of this new type of construction become apparent during field installation of the units. Two men can easily carry the 12-inch valve up the tank ladder.

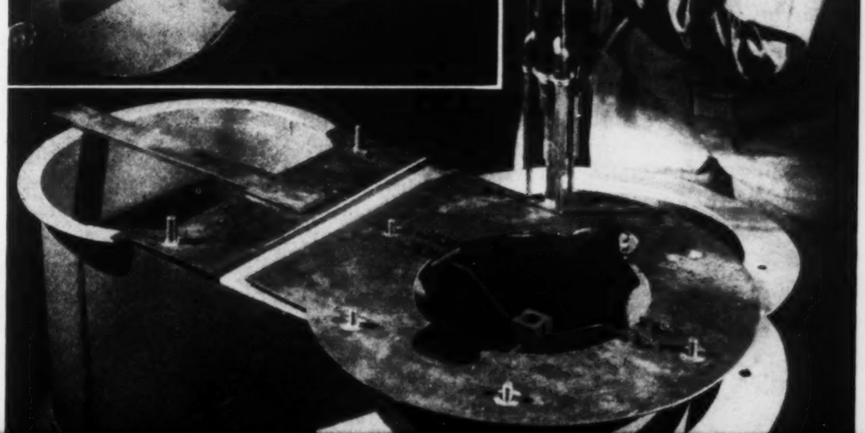


Fig. 1—Six ½-inch studs are end-welded to the valve body using a Nelson stud welding gun and a simple locating template. Threaded female extension rods are fastened to these studs to hold the spun aluminum hood in place. This same template serves as a positioning device for locating the rider upon which the valve diaphragm rides

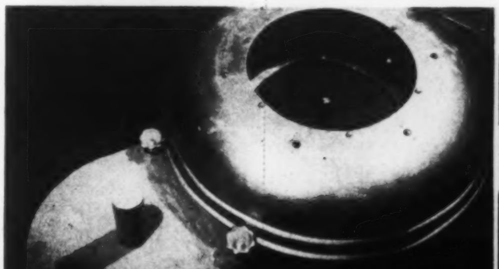


Fig. 2 (inset) — View of assembled Oceco vent valve showing extension rods used to fasten the spun aluminum hood to the fabricated valve body. Cover plate at left of picture is held in place by the two ½-inch studs seen at left of Fig. 1

SEEN AND HEARD IN THE Machinery Field

By GUY HUBBARD
Machine Tool Editor

POCKET OPTICS: Basic principle of measurement in the machine shop is that of "comparison"—either by "feel", as in the case of calipers and gages, or by "eye" as in the case of scales, templets, etc.

One of the wonders of nature is the sensitivity of the touch of skilled mechanics in "feeling" fractions of thousandths, both in fit and in finish. Unaided human eyes, however, are somewhat more limited in their ability to "see" fine degrees of comparison.

For many years tool engineers have experimented with optical instruments as aids to eyes in fine comparative measurements of machined parts. One group has worked on direct magnification. That group has made various modifications of microscopes familiar tools in precision shops. Another group has worked on projection—the principle developed long ago as the "magic lantern". This group has made the refined optical projection comparator a shop tool even more common than the microscope in production shops dealing with close limits and complex shapes.

It was inevitable that someone somehow would succeed in using both principles in an instrument combining some of the "comparing ability" of the projection comparator with the compactness of the microscope. Harry W. Barkley, president, National Tool Co., Cleveland, has just initiated me into the mysteries of the design and use of such an instrument.

This well-named "pocket comparator", developed and made by Bell & Howell Co., Chicago, and sold by National Tool Co., at first appears to be so simple that one is inclined to exclaim: "How come I didn't think of that?" However, there is a lot more to it than meets the eye at first glance.

When Mr. Barkley disassembled the little instrument, I discovered that what appeared to be a six-power magnifying glass, actually is the equivalent of a short focus anastigmat lens of high quality. Also, what to the casual observer is a "reticle" with some lines and figures engraved on it, actually is a highly finished piece of optical glass carrying an amazingly accurate and complete collection of scales, angles, circles, lines and radii.

Drawn originally as a highly accurate and greatly enlarged layout, this pattern has been photographed and etched on the reticle (optically projected in reverse) in such a way that when superimposed on the work and viewed six times full size through the lens, "comparisons" can be made to thousandths with the greatest of ease. Illumination of reticle and work is attained by the simple and clever expedient of mounting the reticle in a transparent plastic sleeve screwed into the lens mount to permit quick, sharp focusing.

No claim is made that this pocket comparator takes the place either of a powerful shop microscope or a powerful projection comparator. However, a tremendous number of useful things can be accomplished through simple six-power magnification and comparison—at a price which puts this pocket instrument within pocket book range of any technician or tool engineer who can afford micrometers or a good set of drafing instruments. I myself am now the proud owner of one of these pocket comparators.

WORK AND TOOL HOLDING: On recent visits to machine tool plants, I have seen an increasing number of cases of standard machines tooled for mass production of specific parts—wherein cost of the machine itself is far overshadowed by the cost of the work holding and tool holding devices and the tools themselves.

While material accounts for some of the extra costs which must be added to the list price of these machines, major part of the increased price is due to engineering costs involved in development of special chucks, special fixtures, special tool holders and special tools. These added costs often are hard to explain to customers—especially those who are buying only one of the specially equipped machines. However, the costs are thoroughly justified and a good machine tool salesman will be able to explain them satisfactorily—provided that he is armed with the vital facts of the matter.

There has been a lot of talk lately about modern machine tools being "the world's best investment". From my recent observations, I am convinced that this slogan actually should be, "a properly tooled modern machine tool is the world's best investment". A lot of emphasis in this revised slogan should be placed on the "holding" phases of the tooling—those having to do with getting the work in and out of the machine in minimum time and also getting dull or damaged tools replaced in minimum time.

People who build automatics long have been cognizant of these things and have gone far in their solution. Chucking and unchucking, both in bar and "chucking" automatics, is accomplished in seconds or fractions thereof. Replacement of tools even in the highly complex tooling systems of the "multiples" is accomplished with surprising ease and speed.

As an old-time automatic man I have not been too favorably impressed lately by some demonstrations of "flash" machining in certain other types of machines, wherein the cutting was done in seconds but loading and unloading of work involved minutes of fumbling around with chuck wrenches and babbitt hammers. Machines tooled that way definitely "are not the world's best investment".

There is room today for a lot of reformed tool engineering in the realm of work and tool holding. It is going to run into money but it will mean profits to customers which will pay handsome returns on the added costs. Therefore sales talks at the same time must be reformed to deal with the situation. No machine tool builder can afford to give these things away. No customer can afford to be without them.

GRAPHIC INSPECTION METHOD

By FRED BOHLE
Chief Engineer
Illinois Tool Works
Chicago

Pin Points Errors in Machined Parts

Automatic recording of inspection instrument readings is proving valuable in checking gears and other parts with complex surfaces. Recording saves inspection time, gives accurate, permanent records which can be quickly interpreted to locate causes of errors. Charts of mating gears and their cutting tools can be superimposed and matched

INSTRUMENT readings of many types—pressures, temperatures, electric current and liquid flow—have been automatically recorded for many years. Such recording saves labor because it eliminates intermittent instrument checking and has the additional advantage of being easy to interpret.

In recent years, this principle has been applied to the inspection of machined parts and has proved particularly useful in the gear industry where complex surfaces like the helical arrangement of hob teeth or the involutes of gear teeth are commonly encountered. The method has been generally termed "graphic inspection."

Real value of graphic inspection lies in the fact that the recorded chart reveals the true condition of the inspected surface much more accurately than figures can. A recorded graph will reveal, by the nature of its pattern, the real cause of the errors whereas figures representing indicator readings can tell only the magnitude of these errors. In addition, graphic inspection helps in improving a product because it indicates adjustments that must be made to improve accuracy.

Gear Rolling Fixtures — Graphic inspection was probably first applied to gear rolling fixtures. In the checking machines developed, the gear was rotated through one complete revolution in intimate contact with a master gear of known accuracy. Variations in center distance during the rotation of the gear were measured by an indicator and recorded at the same time, graphing the combined effect of runout, pitch, tooth thickness and profile error. Fig. 1 shows the typical gear rolling chart produced.

This chart shows at a glance the difference between individual tooth errors and those due to runout and where to take the most effective immediate steps to improve the accuracy. Indicator readings do not supply such information unless they are either mentally or actually transposed into graph form.

This quality control method is easily applied to parts other than gears. Fig. 2, for instance, shows the inspection of a checking arbor by graph. This

Fig. 1—Typical gear rolling chart which shows at a glance the difference between individual tooth errors and those due to runout and where to take the most effective steps to improve the accuracy

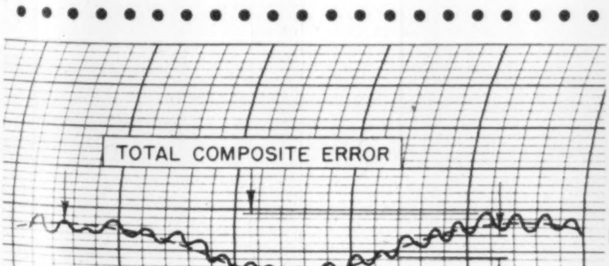
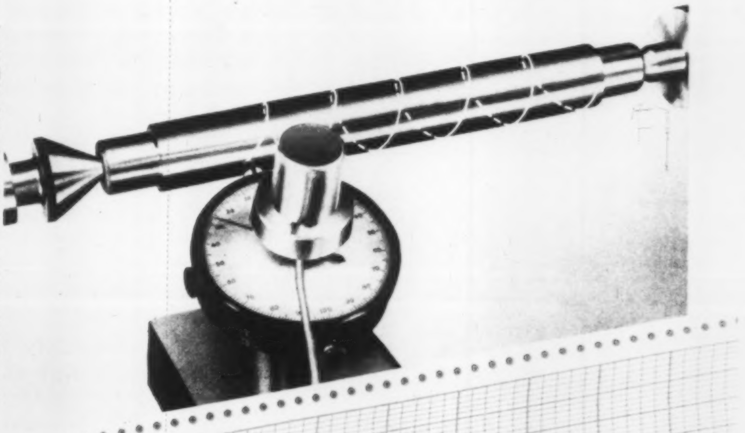


Fig. 2—Inspecting a checking arbor by graph. Graph shows that the arbor runs true on one end, it is correctly and evenly tapered, it has a runout at the other end



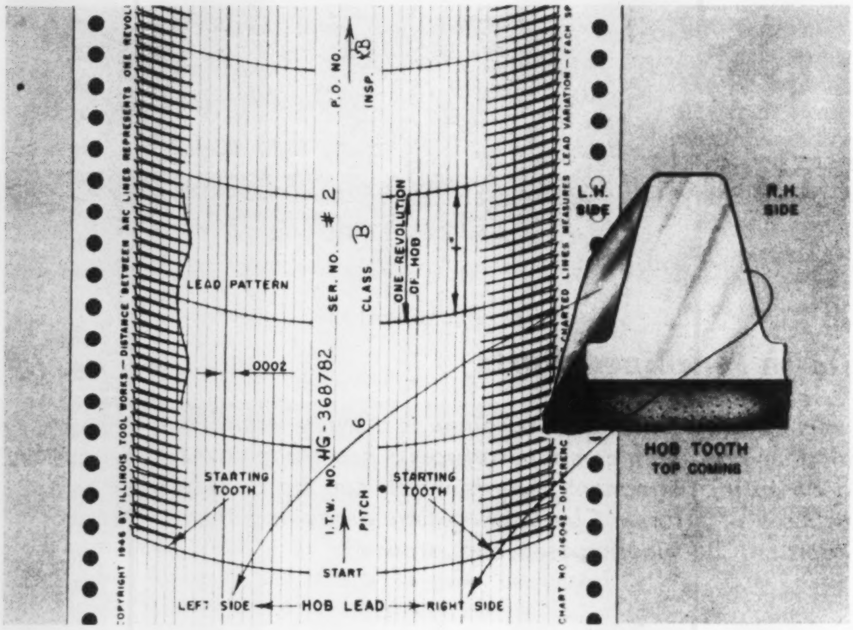


Fig. 3—Chart of hob lead accuracy. In the recorded line each rise and fall of the pen represents a hob tooth. Each peak marks the exact location of the cutting edge. The succession of peaks records the relative position of the cutting edges along the helix

arbor is slightly tapered and, as a checking arbor, must run true at every point. To make the check, it is mounted in a lead checking machine and its entire length is "scanned" with a 1-inch lead. The graph in Fig. 2 shows in one glance that:

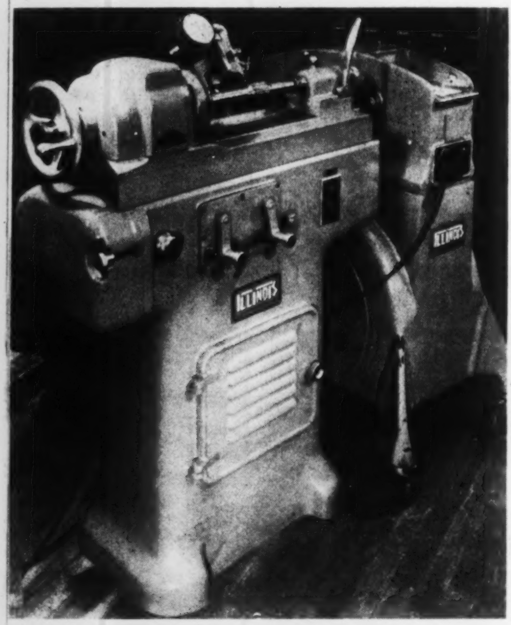


Fig. 4—Inspection machine developed for hob lead checking. The unit on casters at the right is the recording unit that actually produces the graph of inspection results

1. The arbor runs true on one end.
2. It is correctly and evenly tapered.
3. It has a runout at the other end.

The value of inspecting by graph increases when surfaces become more complex as in the helicoidal surfaces of screws and worms. Lead errors take on many forms like progressive deviation, weave patterns due to runout and irregular errors traceable to the machine and the cutting process.

Patterns of Errors—These various forms leave distinctive patterns of errors, and in the recorded chart of the lead it becomes possible to distinguish between these error patterns and thus trace their origin. Frequently, all of these lead errors are combined but the basic patterns are always recognizable and, if eliminated, may bring the total overall errors well in line.

Proper checking of multiple thread worms and screws is hardly possible without graphs. In checking the lead of multiple thread worms, one side of one thread is checked and charted first. The worm is then indexed from accurate plates and, without resetting the indicator, the process is repeated for the other threads. If the leads are perfectly correct, they will show up in the graph as straight lines with offset between the lines indicating spacing errors.

In all probability, however, the lead patterns are wavy and it becomes difficult to distinguish between individual lead errors and spacing errors. The problem is comparable to measuring the spacing between two plates. If the plates are flat, the problem is simple, but what is their spacing if the two plates are warped?

It is possible to draw lines in the graphic inspection chart for a multiple thread worm indicating the average position of each thread. Each line is located approximately half way between the high and the low points of the weave pattern of the thread and the distance between these lines of average position indicates the spacing error. The inclination of these average position lines shows the amount of progressive deviation and a basic wavy pattern indicates runout. Only in this way is it possible to distinguish between the various types of errors.

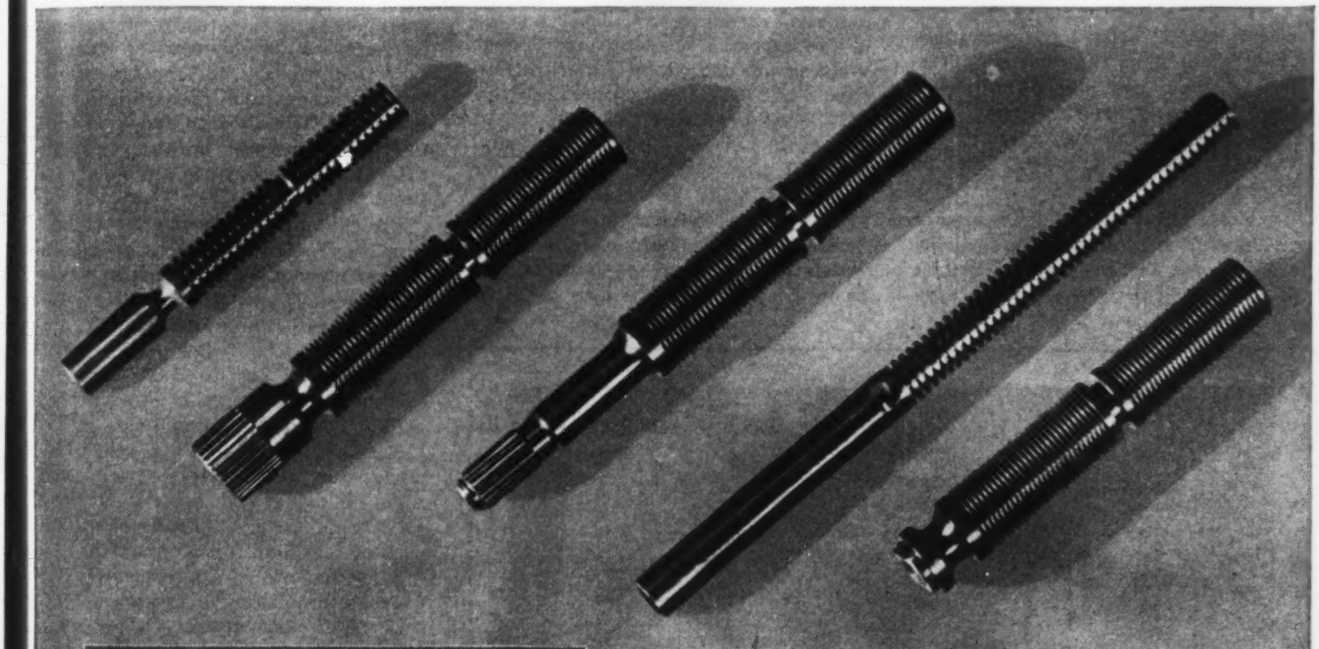
Hob Lead Accuracy—Graphic inspection of leads takes on a particularly useful aspect in the case of hobs. Hobs are manufactured and sold in definite classes of accuracy; helical arrangement of the hob teeth, more than anything else, determines the degree of accuracy. Since hobs do their work by generating, the gear tooth profile is produced by numerous individual cuts and it is through the systematic sequence of these cuts that straight sided hob teeth produce involute profiles. Hob lead accuracy is vital because any misalignment in the helical arrangement of the hob teeth will manifest itself in bad gear teeth. Graphic inspection charts give a positively reliable picture of this vital hob lead accuracy.

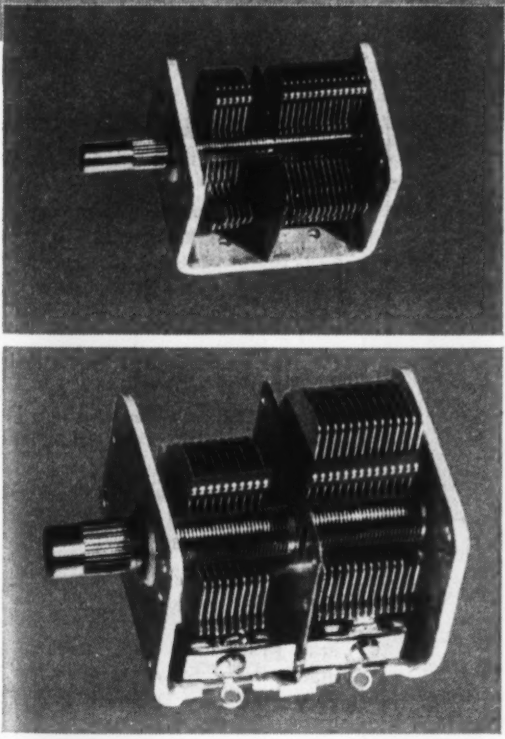
Fig. 3 shows such a chart. In the recorded line of the chart each rise and fall of the pen represents a hob tooth. Each peak marks the exact location of the cutting edge. The succession of peaks records the relative position of the cutting edges along the helix.

The graphic technique is valuable in involute gear inspection too. Extreme accuracy of the involute profile is necessary if mating gears are to transmit angular motion with a constant velocity ratio. The degree of accuracy even in some of the most ordinary applications, is measured in ten-thousandths of an inch. Maintaining such precision tolerances is often difficult. Heat treatment, distortion, runout, improper sharpening of the gear cutting tools, machine errors and strains during the cutting process are major sources of inaccuracies in involute profiles.

On the other hand, deviations from the involute are sometimes intentionally produced. Tip relief compensates for small spacing errors by bringing the teeth into contact more

For Tough Machining Jobs, Get
REVERE FREE-CUTTING BRASS





Above, Model CS, smallest condenser, air space .009". Below, Model B, largest, air space .013". Rotor shafts, shown in top illustration, are Revere Free-Cutting Brass, plates aluminum. Made by The American Steel Package Co., Defiance, Ohio, an important supplier to the electronics industry.

HERE are several examples of the fact that Revere Free-Cutting Brass is really good. These rotor shafts for variable condensers are cut on automatic machines at 3600 r.p.m. Circular tools are used to cut the concentric slots which are .050" deep. Only one cut has to be taken. Approximately 425 pieces are produced per hour on a 6-second cycle. The American Steel Package Company, Defiance, Ohio, produces a number of different condenser models, with air spacing ranging from .009" up to .042". The slots in the shaft of Revere Free-Cutting Brass are all of the same width, regardless of air spacing, namely .014" plus or minus .0002". It takes good machines, good tools, good men, and good metal to work that closely. A report from a Revere Technical Advisor who had collaborated with the company states: "Customer is outstanding in his praise of Revere Rod." . . . If you have a problem in the machining of brass, why not give Revere an opportunity to work with you? The Revere Technical Advisory Service is at your command.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

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gradually. Some deviations compensate for heat treatment distortions and others for deflection under load. The successful use of these precision involute deviations and correction of involute errors requires a reliable means for measuring and charting the gear tooth form.

Graphic inspection and recording makes involute errors easy to locate. Because chart movement can be made proportional to gear movement, the profile charts of mating gears can be compared directly by superimposing and matching the charts on the basis of their common pitch point. Such matching quickly shows the relative importance of gear errors . . . in some cases they will tend to cancel out.

Involute graphs of shaper cutters and shaving cutters may also be compared against those of the gears they are cuttting. Direct conclusions may be drawn regarding the accuracy of the machines and the cutting process.

Welding To Be Discussed

NEW data on voltage dip effects and voltage drop interference between welders will aid in future designs of power supply systems for resistance machines. Information on this subject and on mechanical rectifier arc welders, submerged arc welding, stud and gas welding and high frequency induction welding will be discussed at the Second Conference on Electric Welding, sponsored by American Institute of Electrical Engineers in Detroit, April 5, 6 and 7.

A technical session on power supply will also consider welder feeder systems and the use of series capacitors at main transformer primaries. Sessions on instrumentation, arc and resistance welding equipment and basic arc research will also be highlights. Two evenings will be devoted to practical demonstration of welding machines and new techniques. Registration cards and programs may be obtained from E. D. Kane, Detroit Edison Co., Detroit 26, Mich.

OPERATION CLAMSHELL: More than $900 in maintenance cost per season is saved by the installation of manganese-molybdenum alloy steel plate as trays and liners in this 17-ton capacity Hulett unloader. Trays of this unit, which is one of four raw material unloaders at Union Dock Co., Ashtabula, O., unloaded 1,355,527 tons of iron ore and highly abrasive quartzite from lake carriers. After one and one-half seasons, trays are still in good condition and will be used again this coming season. Jalloy, the high tensile abrasion and impact-resistant steel used in the trays, is made by Jones & Laughlin Steel Corp., Pittsburgh

Tool Speeds Boiler Production

FIRST application of a new recessing tool designed for unusually heavy work has been to decrease machining time of high pressure steam boiler tube hole counter-cores by 80 per cent or more. A development of Maxwell Co., Bedford, O., it employs standard recessing tool mechanism, consisting of helical gear and rack and facilitates counter boring or boiler tube entries in as little as 30 seconds time.

On this particular operation, cutting was performed on high tensile strength boiler plates which had been rolled, welded and stress relieved. The tool enters a hole 2.516 inches in diameter in the boiler plate, which ranges from 2¼ to 5½ inches in thickness. The operation is performed at 100 rpm using hand feed.

Features of the tool are said to include automatic release to permit rapid indexing and repositioning for subsequent cuts, chip-free operation, use of circular form grinder having regrind life of approximately 120 degrees, provision for coolant to cutter edge, easy access to adjusting collars for location of recess and diameter of counter bore and aluminum-bronze pilot bushing.

Steel Castings Reference Chart

DETAILED reference material on specification designations, analyses, physical properties, heat treatment and related data on 18 high alloys and 15 low alloys and carbon steels are incorporated in two revised steel casting reference charts. Compiled by Lebanon Steel Foundry, Lebanon, Pa., the charts cover steels developed to fulfill a wide range of exacting engineering and design requirements for various kinds of industrial applications.

Carbon and low alloy steel castings covered in one chart provides the engineer with 15 grades suitable for a variety of services where welding, high structural strength and creep resistance are important. Several grades of high strength castings with a broad range of physical properties are offered and derived by controlled heat treatment methods. The second chart, covering stainless, corrosion-and heat-resistant alloy castings is devoted to 18 selected grades which are ideally suited for various applications that are designated.

FUNDAMENTALS
of
STEELMAKING
NUMBER
23
OF SERIES

Another in a continuing series of articles on the making of steel and finishing it into products ready for the consumer. Each article is written by an outstanding authority in his particular field.

Production of FORGINGS

The author herewith presents a discussion of the various types of forging presses, heating units and cleaning equipment used in the forging industry. Each has definite advantages and should be selected with care if optimum results are desired

By WALDEMAR NAUJOKS
Special Projects Engineer
Ladish Co.
Cudahy, Wis.

PART II

FORGING PRESSES deliver their forging pressure through the medium of a slide, which is similar to the ram in drop hammers. Pressure is delivered to the slide either through hydraulic or some type of mechanical means, depending upon the type of press. Forging pressure is of the "push" type and presses do not develop impact vibration which is common to hammers. Press forging dies can be designed to use several steps, as in drop forging dies, but the design must consider that each step is completed in one press stroke. In drop forging, several blows can be given on each step if desired and the total blows in a three step drop forging job may run from ten to thirty. A three-step press forging would require three press strokes. Fig. 8 shows a set of press forging dies.

Presses normally used for impression die forging may be of three different kinds, depending upon the type of forging to be performed. They are the eccentric crank mechanical forging press, the percussion power forging press and the hydraulic forging press.

Mechanical presses use an eccentric crank to impart forging pressure to the slide. Due to high operating speeds of these presses, special heavy duty clutch mechanisms are necessary. Mechanical forging presses find extensive use in ferrous and nonferrous forging fields for producing a broad variety of shapes and sizes. This type press is essentially a high production machine which finds its principal use for large quantity work. Mechanical presses are built in commercial sizes from about 500 to 6000 pounds maximum working pressure. Smaller sizes operate at speeds of 80 to 120 strokes a minute and larger sizes run at speeds of 40 to 70 strokes a minute. These high operational speeds indicate that the actual forging pressure may be a combination of impact and push pressure. Fig. 9 shows a typical mechanical forging press.

Percussion power forging presses utilize a heavy steep-threaded screw running through a fixed nut to develop up-and-down travel in the press slide. A flywheel fastened at the screw top receives friction contact from one of two constantly revolving disks, each moving in opposite directions. One disk drives the steep-threaded screw downward and the other raises it. All flywheel energy is utilized as the slide comes to a stop at the bottom of the stroke. Percussion power presses are used normally for hot forging of brasses, bronzes, and other nonferrous metals. Light percussion forging presses, those ranging from

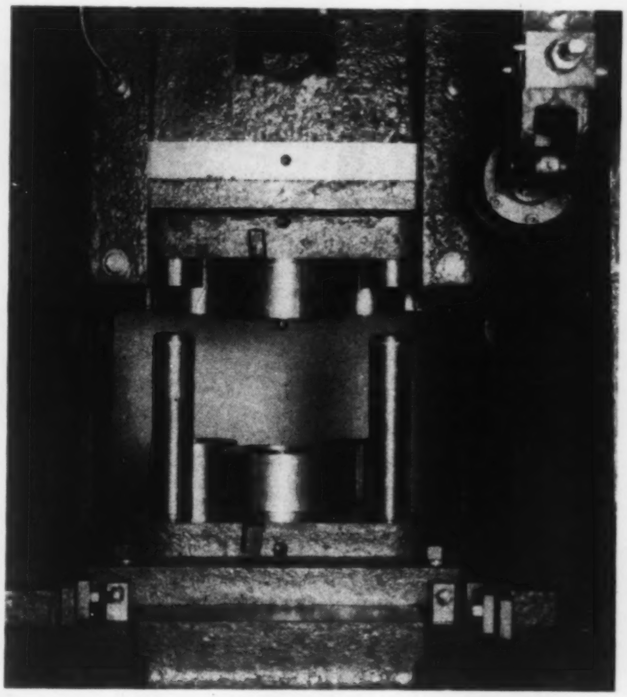
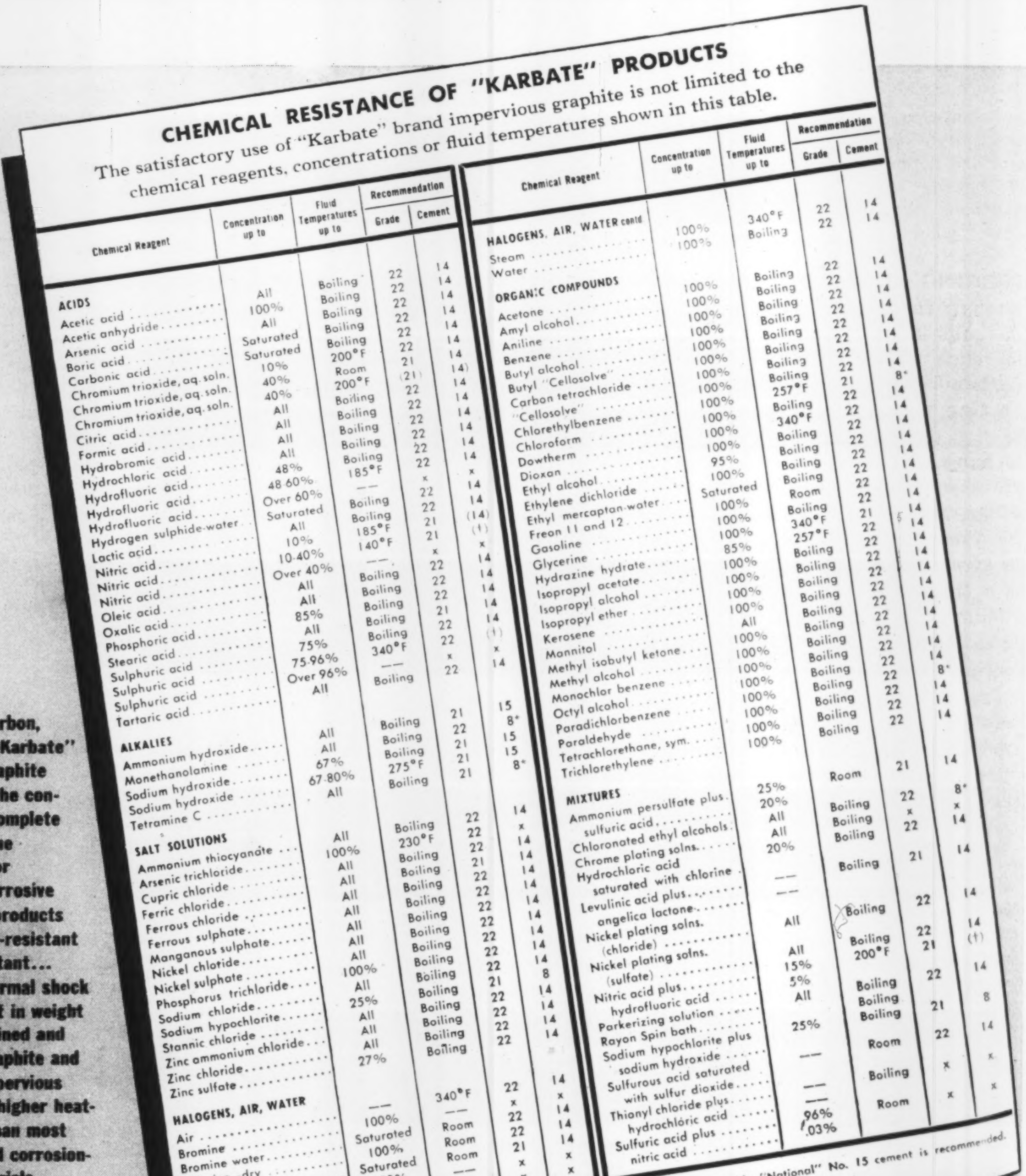


Fig. 8—Typical impression dies for use in a mechanical forging press. Note that solid die block is not used. The three steps are machined in three individual blocks which are fastened in a holder, or in a shoe

CORROSION



CHEMICAL RESISTANCE OF "KARBATE" PRODUCTS

The satisfactory use of "Karbate" brand impervious graphite is not limited to the chemical reagents, concentrations or fluid temperatures shown in this table.

Chemical Reagent	Concentration up to	Fluid Temperatures up to	Recommendation	
			Grade	Cement
ACIDS				
Acetic acid	All	Boiling	22	14
Acetic anhydride	100%	Boiling	22	14
Arsenic acid	All	Boiling	22	14
Boric acid	Saturated	Boiling	22	14
Carbonic acid	Saturated	Boiling	22	14
Chromium trioxide, aq. soln.	10%	200°F	22	14
Chromium trioxide, aq. soln.	40%	Room	21	14
Chromium trioxide, aq. soln.	40%	200°F	(21)	14)
Citric acid	All	Boiling	22	14
Formic acid	All	Boiling	22	14
Hydrobromic acid	All	Boiling	22	14
Hydrochloric acid	All	Boiling	22	14
Hydrofluoric acid	48%	Boiling	22	14
Hydrofluoric acid	48-60%	185°F	22	14
Hydrofluoric acid	Over 60%	——	x	x
Hydrogen sulphide-water	Saturated	Boiling	22	14
Lactic acid	All	Boiling	22	14
Nitric acid	10%	185°F	21	(14)
Nitric acid	10-40%	140°F	21	(†)
Nitric acid	Over 40%	——	x	x
Oleic acid	All	Boiling	22	14
Oxalic acid	All	Boiling	22	14
Phosphoric acid	85%	Boiling	22	14
Stearic acid	All	Boiling	21	14
Sulphuric acid	75%	Boiling	22	14
Sulphuric acid	75-96%	340°F	22	(†)
Sulphuric acid	Over 96%	——	x	x
Tartaric acid	All	Boiling	22	14
ALKALIES				
Ammonium hydroxide	All	Boiling	21	15
Monethanolamine	All	Boiling	22	8*
Sodium hydroxide	67%	Boiling	21	15
Sodium hydroxide	67-80%	275°F	21	15
Tetramine C	All	Boiling	21	8*
SALT SOLUTIONS				
Ammonium thiocyanate	All	Boiling	22	14
Arsenic trichloride	100%	230°F	22	x
Cupric chloride	All	Boiling	22	14
Ferric chloride	All	Boiling	21	14
Ferrous chloride	All	Boiling	22	14
Ferrous sulphate	All	Boiling	22	14
Manganous sulphate	All	Boiling	22	14
Nickel chloride	All	Boiling	22	14
Nickel sulphate	All	Boiling	22	14
Phosphorus trichloride	100%	Boiling	22	14
Sodium chloride	All	Boiling	22	14
Sodium hypochlorite	25%	Boiling	21	8
Stannic chloride	All	Boiling	22	14
Zinc ammonium chloride	All	Boiling	22	14
Zinc chloride	All	Boiling	22	14
Zinc sulfate	27%	Boiling	22	14
HALOGENS, AIR, WATER				
Air	——	340°F	22	14
Bromine	100%	——	x	x
Bromine water	Saturated	Room	22	14
Chlorine—dry	100%	Room	22	14
Chlorine water	Saturated	Room	21	14
Iodine	100%	——	x	x
Fluorine	100%	——	x	x
HALOGENS, AIR, WATER contd				
Steam	100%	340°F	22	14
Water	100%	Boiling	22	14
ORGANIC COMPOUNDS				
Acetone	100%	Boiling	22	14
Amyl alcohol	100%	Boiling	22	14
Aniline	100%	Boiling	22	14
Benzene	100%	Boiling	22	14
Butyl alcohol	100%	Boiling	22	14
Butyl "Cellosolve"	100%	Boiling	22	14
Carbon tetrachloride	100%	Boiling	22	14
"Cellosolve"	100%	Boiling	22	14
Chlorethylbenzene	100%	257°F	21	8*
Chloroform	100%	Boiling	22	14
Dowtherm	100%	340°F	22	14
Dioxan	100%	Boiling	22	14
Ethyl alcohol	95%	Boiling	22	14
Ethylene dichloride	100%	Boiling	22	14
Ethyl mercaptan-water	Saturated	Boiling	22	14
Freon 11 and 12	100%	Room	22	14
Gasoline	100%	Boiling	22	14
Glycerine	100%	340°F	21	14
Hydrazine hydrate	85%	257°F	22	14
Isopropyl acetate	100%	Boiling	22	14
Isopropyl alcohol	100%	Boiling	22	14
Isopropyl ether	100%	Boiling	22	14
Kerosene	100%	Boiling	22	14
Mannitol	All	Boiling	22	14
Methyl isobutyl ketone	100%	Boiling	22	14
Methyl alcohol	100%	Boiling	22	14
Monochlor benzene	100%	Boiling	22	14
Octyl alcohol	100%	Boiling	22	14
Paradichlorbenzene	100%	Boiling	22	8*
Paraldehyde	100%	Boiling	22	14
Tetrachlorethane, sym.	100%	Boiling	22	14
Trichlorethylene	100%	Boiling	22	14
MIXTURES				
Ammonium persulfate plus sulfuric acid	25% 20%	Room	21	14
Chloronated ethyl alcohols	All	Boiling	22	8*
Chrome plating solns.	All	Boiling	x	x
Hydrochloric acid saturated with chlorine	20%	Boiling	22	14
Levulinic acid plus angelica lactone	—— ——	Boiling	21	14
Nickel plating solns. (chloride)	All	Boiling	22	14
Nickel plating solns. (sulfate)	All	Boiling	22	14
Nitric acid plus hydrofluoric acid	15% 5%	200°F	21	(†)
Parkerizing solution	All	Boiling	22	14
Rayon Spin bath		Boiling		
Sodium hypochlorite plus sodium hydroxide	25%	Boiling	21	8
Sulfurous acid saturated with sulfur dioxide	——	Room	22	14
Thionyl chloride plus hydrochloric acid	—— ——	Boiling	x	x
Sulfuric acid plus nitric acid	96% .03%	Room	x	x

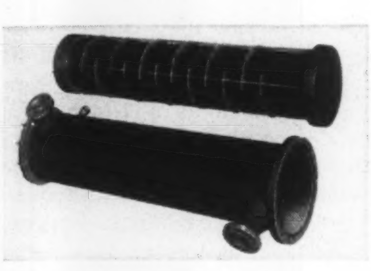
NOTES: (†) "National" No. 14 Cement used with threaded joints will give serviceable life of at least six months.

* For field assembly "National" No. 15 cement is recommended.
x Not recommended.

"National" carbon, graphite and "Karbate" impervious graphite are ideal for the construction of complete systems for the manufacture or handling of corrosive fluids. These products are both alkali-resistant and acid-resistant... immune to thermal shock ...strong, light in weight ...easily machined and fabricated. Graphite and "Karbate" impervious graphite have higher heat-conductivity than most commonly used corrosion-resistant materials. The following table gives complete information on the corrosion-resistance of "Karbate" materials.

and what to do about it—

Install carbon, graphite and "Karbate" impervious graphite equipment for storage, conveying, and processing of corrosive fluids



HEAT EXCHANGERS—

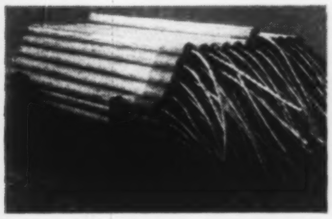
"Karbate" impervious graphite heat exchanger types include: shell and tube, cascade, plate, bayonet and concentric. Available in standard sizes or tailored to your specifications. Provide excellent heat transfer. Resist acids and alkalis, immune to thermal shock, stand strain and vibration, light in weight, easy to install. Write for Catalog Section *M-8808-A*, describing Shell and Tube types; *M-8804* and *M-8809*, describing Plate type and Bayonet type; and *M-8807-C*, describing the Cascade type.

PIPE AND FITTINGS—

"Karbate" impervious graphite pipe and fittings in a complete size range include: elbows, crosses, couplings, caps, tees, plugs, nozzles, flanges, blind discs, collars, slotted couplers, flexible couplings. Advantages: top corrosion resistance, immune to thermal shock, light weight, free from corrosion scale, good machinability, strong and not subject to fatigue. Write for Catalog Section *M-8800B* for ordering details on sizes, dimensions, grades. Catalog Section *M-8801-A*, the Installation Manual, tells you how to cut, serrate, cement, thread and support "Karbate" pipe. Also Catalog Sections *M-9100-A* on "Karbate" pumps and *M-8803A* on globe valves.

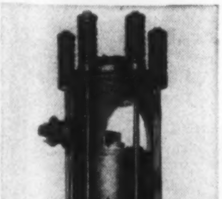
BRICK AND BLOCKS—

"National" carbon and graphite brick and blocks come in a complete range of sizes and shapes for such jobs as linings for stainless steel pickling tanks, sulphate digesters, caustic scrubbing towers, starch hydrolysis equipment, *phosphorus combustion chambers, phosphoric acid hydrators, sulphuric acid concentrators.* Brick and blocks also used for blast furnace and runout trough linings, where resistance to extreme heat and corrosion must be combined. All shapes are strong, immune to thermal shock, hold their shape at extremely high temperatures, are light in weight and easy to install. Write for Catalog Section *M-8300-A* for complete brick information.



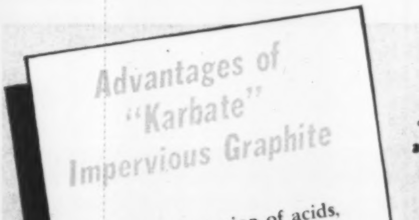
GROUND ANODES—

"National" Graphite, Na graphite and carbon ground anodes, used in connection with "National" BF-2 backfill material, will greatly increase the life of any buried metallic structure subject to soil and stray current corrosion. These anodes have been in service since 1924 and are tried and proved. Anodes are used to protect pipe lines, oil well casings, water mains, gas mains, refinery equipment, tank farms, underground cables, hot water tanks, chemical tanks, underwater structures, power plant equipment, barges, cooling tanks and coils, structural footings and many other similar items. Write for Catalog Sections *M-8500-A.*



TOWERS AND MISC. EQUIPMENT—

Towers made of "Karbate" impervious graphite provide low maintenance and long service life in absorption, fractionation, extraction, scrubbing and related processes. High structural strength, excellent resistance to corrosion and thermal shock, light weight. Bubble caps, trays and distributors made of carbon, graphite or "Karbate" impervious graphite for use in towers. *Carbon Raschig* rings for tower packing in a wide range of sizes. Write for Catalog Sections *M-9600* and *M-9601-A* for information on HC1 absorbers; *M-9000-A* for Raschig rings.



Advantages of "Karbate" Impervious Graphite

- Resists the action of acids, alkalis and other chemicals
- High thermal conductivity
- Resistant to mechanical shock
- Immune to thermal shock
- Easy to machine and install
- Light in weight

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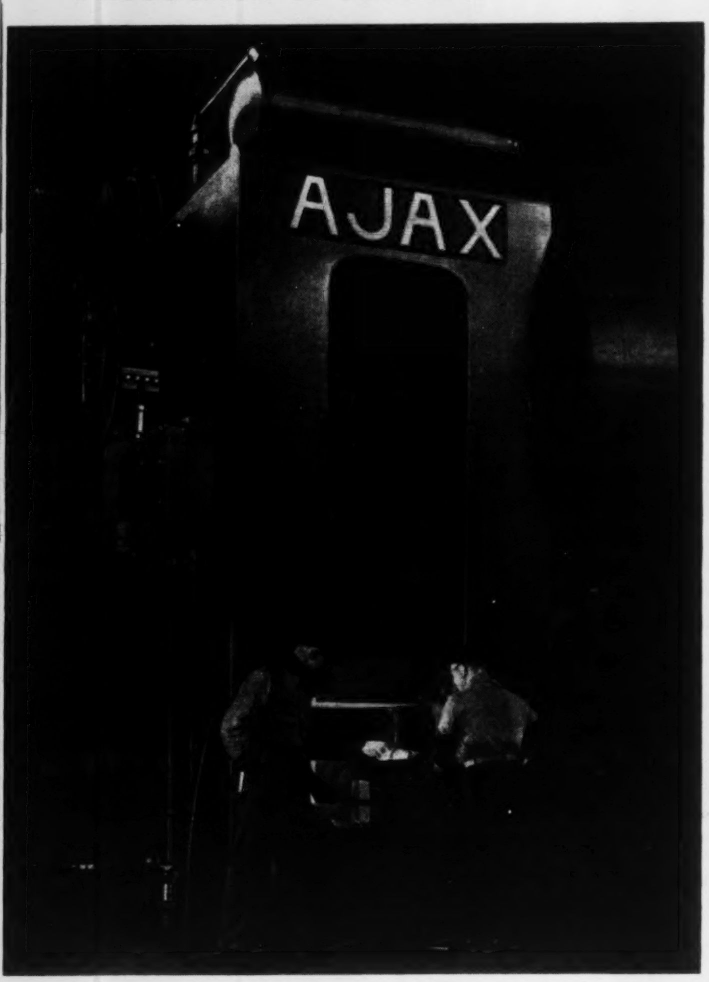


Fig. 9—Mechanical forging press of 1600-ton size shown in operation

about 1 to 25 tons working pressure are used for light jewelry, shell embossing on artificial flowers and leaves, optical work and small jewelry, class pins, etc. The 50 to 100 ton presses are used on medals, signet rings, watch cases, and work of this class. From 100 to 250 ~~ton~~ presses are used for small brass forgings, heavy hot and cold stampings, cold pressing of small steel parts such a scissors, manicure tools, and hot pressing of brass articles. From 400 tons working pressure and up, percussion presses are used for all kinds of valve tappets, small steel forgings, hot pressed brass parts, and cold stampings. Normal commercial sizes of percussion power forging presses are from one to about 1000 tons.

Hydraulic forging presses, while finding extensive use in the smith forging field, are used to a more limited degree for impression die forgings. They are used largely for production of brass and bronze die forgings, and because of their tendency to "set" on the work before returning, are desirable for coining and hot forming. Hydraulic forging presses for impression die forging are used in sizes from about 250 to 3000 tons. One special hydraulic forging press of nearly 20,000 tons capacity has been installed.

The forging machine, earlier known as an upsetter, is essentially a double action press operating in a horizontal position. It is designed to tightly grip a round bar near the end, leaving the hot end open so that is can be moved, by push forging pressure, into the die cavity. In one cycle of operation, bar stock is placed against the stationary die in the proper impression after which a treadle or button is pushed. Engaging of the operating clutch moves a sliding die against a stationary die to grip the bar stock. This is followed by the forward movement of a header punch which pushes against the hot bar end to force it into the die cavity. Header punch then recedes and the movable die slides to its open position. The header slide and punch is moved forward and backward by means of a heavy eccentric crank. Simple forgings may be completed in one forging step. More complicated work may require from two to five steps to complete forging. Normally, where several steps are required, they can be completed on one heating of the metal stock. Fig. 10 shows some typical forging machine products. Sizes are always given in inches, such as a 1-inch or a 5-inch forging machine. Originally, size in inches was to indicate the machine's maximum size of bar diameter capacity, but today's size rating is no indication of the machine's potential work range. Forging machines are made in sizes from ½-inch to a large 9-inch machine. Fig. 11 shows a typical forging machine.

Forging rolls, while not used to the extent that hammers or presses are used in forging plants, are important for high production forgings where sections must be drawn out to long thin sectional areas. They are similar in appearance to bar rolls used in steel rolling mills. They differ in that they are actually only half-rolls, or have rolling surfaces for 180 degrees of the revolution and blank space for the remainder of the revolution. An operator, with a hot piece to be worked down, uses the open space to place stock into the rolls to the proper depth. As rolling portions of the roll come together, the forging stock is rolled outward towards the operator being reduced in cross-sectional area. Usually a number of

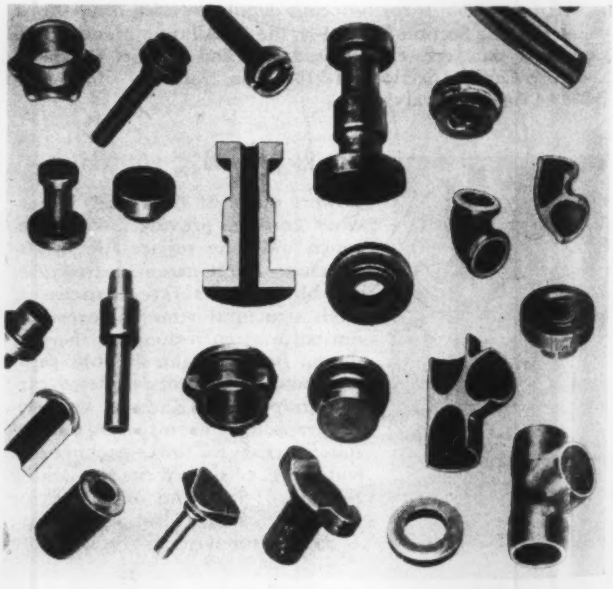
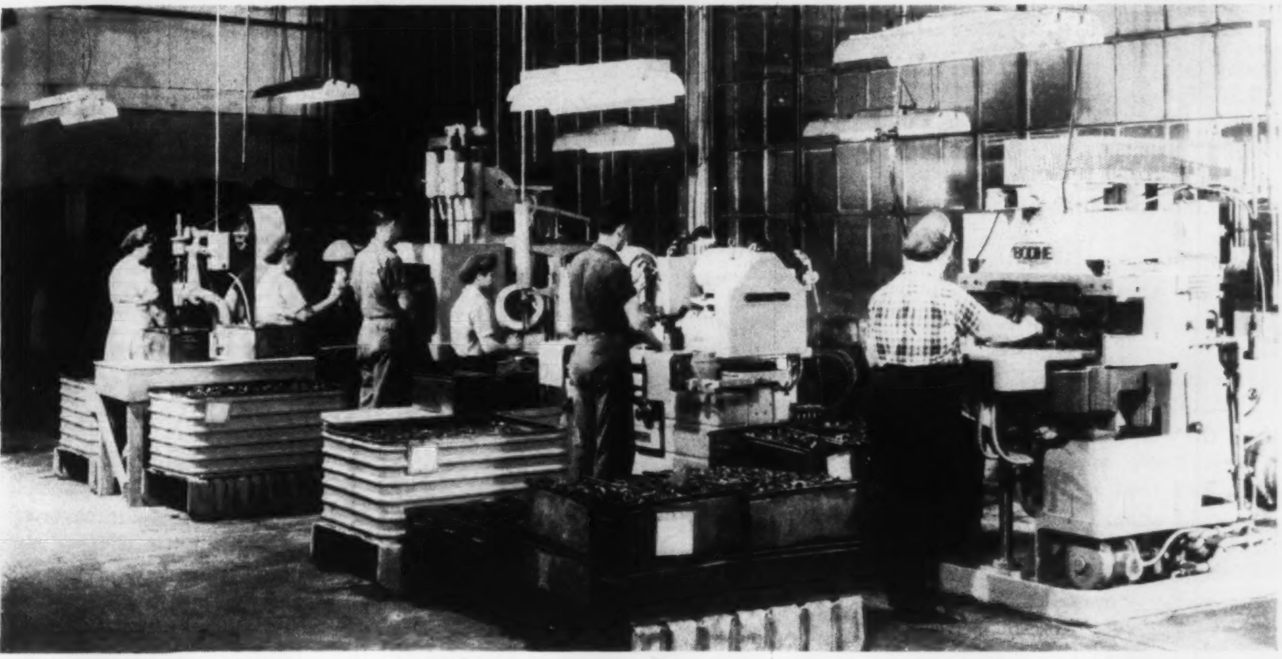


Fig. 10—Work produced by a forging machine

METAL STAMPINGS



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The equipment shown here is indicative of Leake's facilities for machining, trimming, assembly, welding and induction heating. Included are multiple-spindle machines for drilling, milling, tapping, and screw inserting, six-spindle horizontal and two-spindle vertical diamond boring machines, power screwdriver, drill presses, spot and press welders and a two-stage induction heater.

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roll passes are needed to obtain desired reduction in area and proper length. Numbers indicating sizes of the forging rolls are meaningless to one not experienced in their use. Standard numbers range from the small No. 0 size which is capable of drawing out a taper of about 11-inches to the large No. 4 forging roll which draws out a taper up to about 55-inches.

In the past a smith forging shop concerned itself almost entirely with forging. Even cutting of long billets or bars was performed under the hammer by furnace heating a length of bar and then hammering a knife-like blade into it at the proper length to hot-cut the piece. Scale removal by pickling or blasting is of rather recent origin, and heat treatment of forgings to impart toughness is a technique that was developed in the past 30 years.

Present day forging plants may have in their cutting department, several kinds of cutting machines. Basic cutting machine is the power shear, usually of the guillotine press type, which is used for hot and cold shearing. Shears of this type can be obtained in sizes that cut cold billet stock up to about 7-inches square. Some steels tend to develop shear cracks when cut cold and require prior heating. Alligator type cold shears are indicated for use on small diameter round bar stock.

Circular cold cut and power hack saws have become quite common in recent years. Both are built in high speed rugged types and find considerable use in sawing alloys that do not lend themselves to cold shearing. Their high speeds have made them desirable as cutting units and eliminate necessity of heating and handling of hot bars.

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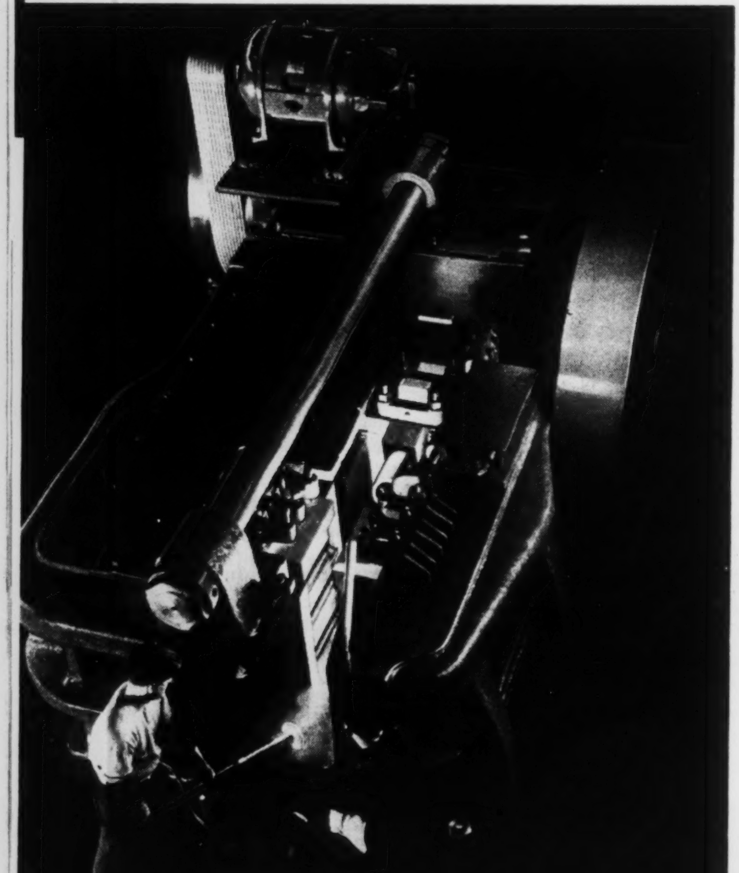

Fig. 11—Five-inch forging machine producing large flange on shaft in three forging steps

Modern metallurgy has developed forging alloys that are not cut readily with shears or saws, which require abrasive cutting equipment. Saws using abrasive wheels have been developed to cut rapidly and accurately and are a necessary part of the cutting equipment in forging plants where highly alloyed compositions are forged. A circular band saw is used to a limited degree for production cutting but finds a more extensive use in shop laboratories where specimens are prepared for inspection and testing.

Drop forgings and press forgings normally require a trimming operation to remove the thin plate-like metal that has been squeezed out between the dies at the die parting plane. This excess metal is called "flash" and is removed by a shearing operation in a power press. Trimming tools consist of a set of trimmer blades whose edges fit around the forging contour at the parting plane, and a punch which pushes the forging through the trimming blades. The punch pushing face has an even bearing on top of the forging so that the forging is not bent or twisted in the trimming operation. This operation may be performed either cold or hot. Small forgings of carbon steels or low alloy steels are trimmed cold. Medium and large forgings are usually trimmed hot in a press located adjacent to the forging hammer. While normal practice is to push the forging through the trimming blades, there are times when it is held in position and the cutting blades are used to shear the flash. Punching out of webs in voids in the forging is performed on similar presses, and usually the punch shears away and pushes the slug out of the forging. Where trimming and punching are done hot, it is customary to use the heat remaining in the forging after it has been worked in the hammer or forging press.

Coining, sizing, planishing, and ironing are press operations performed with high tonnage presses.

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81

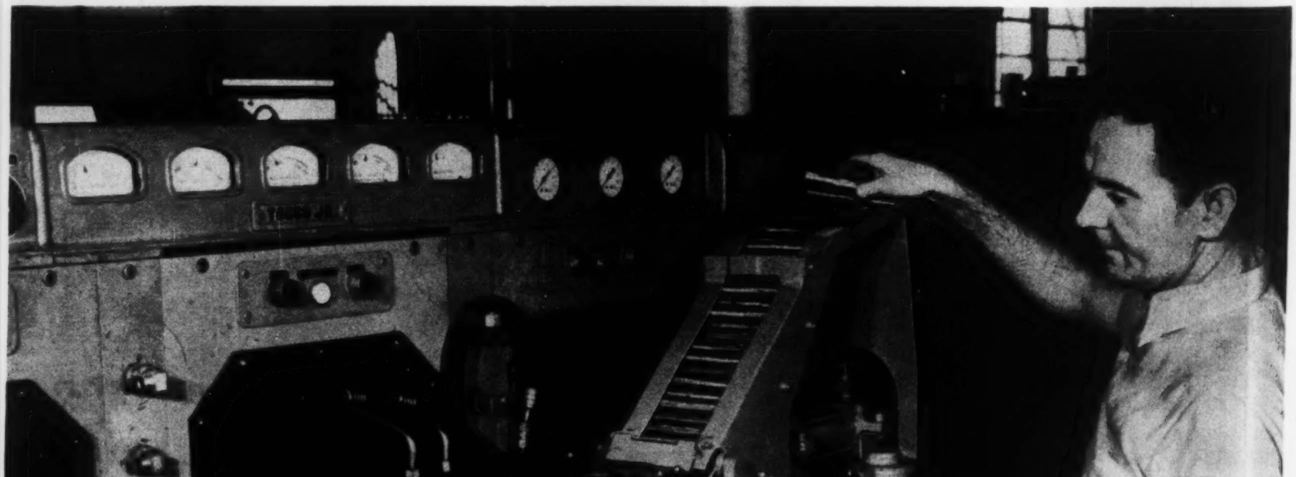
Fig. 12—Typical slot type forge furnace. Note equipment arrangement for moving heated forging stock from furnace to drop hammer and finally to the trimming press

Coining is usually considered an operation where bosses or flat parts of the forging are squeezed under heavy pressure to impart close dimensional tolerances to those sections, so as to eliminate more expensive machining operations. Small bosses can be cold coined to tolerances as close as plus or minus 0.002-inch, the practical accuracy depending upon forging variations from the forging units, size of the bosses, composition of the forging alloy, and capacity of the coining press. Coining presses range in size from about 500 to 3000 tons coin pressure. Sizing, an operation similar to that of coining, is usually performed to tolerances of lesser accuracy and over a greater surface area. Planishing is a coining type of operation on diameters where the part is struck several times and the piece is rolled after each blow. A smooth surface, to close tolerances, is imparted to diameters and ball ends. Ironing is a press operation designed to impart smooth surfaces and to add desired markings. All of the aforementioned operations may be performed cold or at a low red temperature, the choice depending upon amount of metal movement desired. Dots or line marks on the face of a golf club head forging are an example of low red temperature ironing. Other press operations are forming, where sections of a forging are moved in relation with each other; and straightening where warpage and misalignment is removed on long parts.

Heating plays a highly important part in the manufacture of good forgings, a more important part than is realized by some of present day forging plants. Not only is good heating equipment and practice absolutely essential for many of the more complex alloys in use, but good practice brings out better properties in plain compositions. Forge heating furnaces are used in three general types; batch forge furnaces, rotary forge furnaces, and straight continuous, or pusher types, where fuel is burned. Fuel oil and gas are the most common heating fuels.

The batch forge furnace is used most commonly, particularly for heating small and medium sized bars. It is box-like in construction with burners placed at the sides or ends. Furnace front may have a long narrow slot which remains open and through which forging stock is placed into the furnace and taken out for forging when reaching heat. Modern batch forge furnaces are fully insulated with fire brick in order to develop furnace efficiency and to provide

Fig. 13—Fifty kw induction unit for heating small bars for upsetting. Material is heated to 2100 degrees F at the rate of one each four seconds



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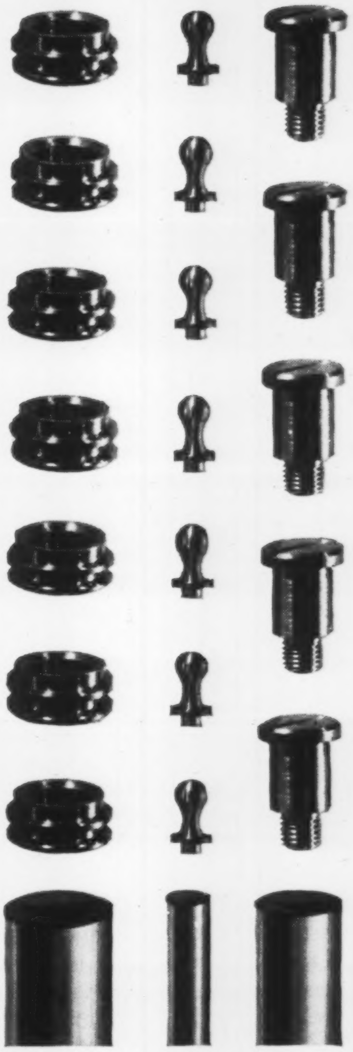

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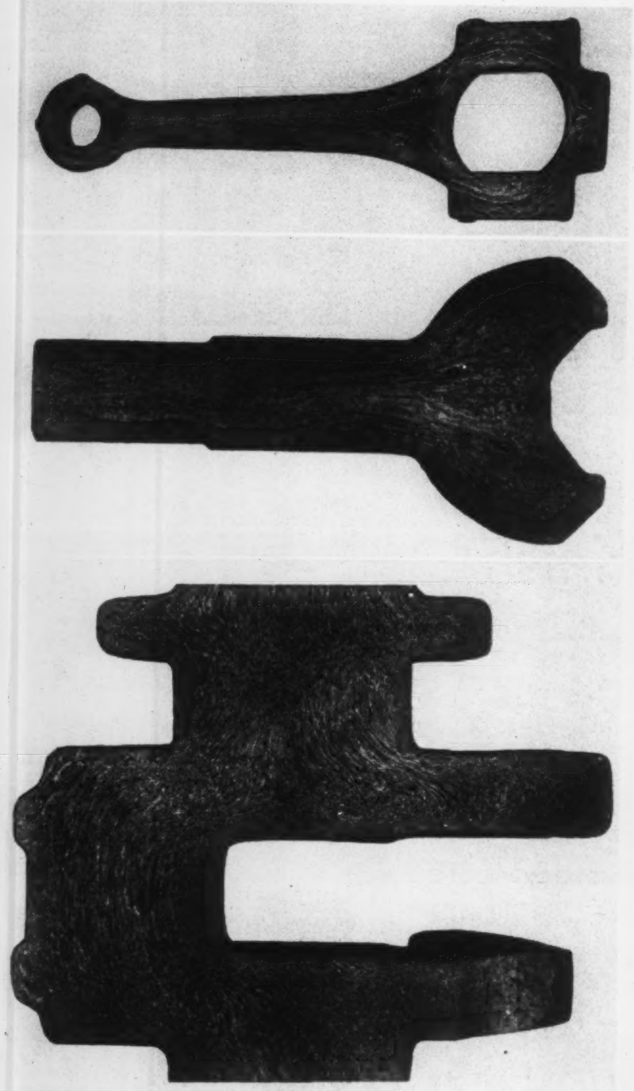

Fig. 14—Fiber structure or flow lines in typical connecting rod, hub shaft and section of crankshaft forgings are shown here

personal comfort for the forging crew. Many of them are equipped with automatic temperature controls so that accurate temperatures can be maintained at all times and their tight furnace design and construction permits a small pressure to be maintained in the heating chamber to prevent infiltration of outside air. Air infiltration in the older types is one of the main causes of excessive scaling on forging stock.

Rotary forge furnaces are circular in construction and have a hearth that rotates very slowly. Purpose of the rotating hearth is to get correct heating by allowing the piece to remain in the furnace sufficiently long for thorough heating but not long enough to overheat. Speed of rotation can be adjusted to suit particular requirements. These forge furnaces are usually equipped with automatic temperature control to insure that forging stock is exposed to correct temperature for the correct amount of time.

The straight continuous forge furnace, commonly known as the pusher type, is a long unit in which forging stock is fed into the furnace at one end, called the charging end, and removed at the other end, called the discharging end. Forging stock, in moving through the furnace length may be slid along on heat resisting rails, or may be moved along directly on the refractory hearth, depending upon furnace design. Where rails for the hearth are used, only square billet stock can be pushed through, with the pieces reposing side by side. Some continuous furnaces are designed with "Vee" grooves to guarantee that stock is pushed through end to end in the grooves. Pusher mechanism is designed to move the entire load as dictated by heating requirements. This mechanism may be of the hydraulic or mechanical type.

Furnace capacities are usually calculated by their ability to heat a given weight of steel to a given temperature during an hour's time.

Temperature usually considered for heating steel forging stock is 2400° F. Batch forge furnaces are built in capacities from 100 to about 300 pounds per hour. Larger capacity batch furnaces are usually built to order. Rotary forge furnaces can be built in sizes to accommodate most any requirement. Some existing rotary furnaces have capacities up to 8000 pounds per hour. Continuous pusher forge furnaces also can be built to any desired capacity, some having capacities of over 10,000 pounds per hour. Fig. 12 shows a typical batch forge furnace.

Induction forge heating, the newest method used in forging plants, gained recognition during the recent world war. At present, it is in its infancy for general forging use, due mainly to high cost of installation and special electrical requirements. Induction forge heating, however, has much to recommend it and may find wider use in the future. Important advantages are in heating stock to temperature without appreciable scaling. More important, perhaps, is the absence of scale in impression dies, for scale greatly increases wear on die impressions, in many cases as much as two to three times. Also, hot forging stock devoid of scale will permit a smoother forged surface, free of roughness which scale can cause. A further advantage is when trouble develops at the hammer or in the dies which shuts down the forging unit, there is not a furnace full of forging stock to be damaged or lost because of excessive scaling or over-exposure to high temperatures. With an induction heating unit, only one or a few pieces are being heated at any given time. Fig. 13 shows a typical induction heating unit.

Forging temperatures required depend upon the particular alloy being forged. Ferrous compositions which include wrought and ingot iron, carbon and alloy steels, tool steels, stainless irons and steels, and some of the nonferrous alloys such as Monel metal and Inconel, require forging temperatures from about 1900 to 2500° F. The exact required temperature depends upon metal composition being heated and somewhat upon its size in section area. Copper base alloys which include copper, brasses, and bronzes usually require forging temperatures in the range between 1100 and 1700° F with exact temperature depending upon the alloy being heated. Aluminum and magnesium forging alloys are normally heated to temperatures between 600 and 900° F. Some compositions in both ferrous and nonferrous groups have wide forging ranges, while other alloys must be worked in rather narrow temperature ranges.

Most forging plants, praticularly those using impression dies for production work, consider cleaning of forgings by scale removal a normal routine procedure. Not too many years ago, scale was removed by pickling in most production forging plants, and while a considerable amount of pickling is still being done, much of the cleaning is now being done by shotblasting. Pickling is a chemical process whereby forgings are immersed in a suitable acid solution for a given length of time, followed by rinsing in water to remove the acid solution. Shotblasting makes use of small steel pellets which are thrown against the forging surfaces to remove scale. Forging scale, in addition to being unsightly, is a hindrance to subsequent machining production because it tends to dull cutting tools and is detrimental to the efficiency of cutting fluids. Tumbling is a cleaning process that found considerable use in forging plants years ago but recently seems to be losing out to shotblasting.

Visual and dimensional inspection is a routine affair in a modern forging plant. After cleaning, all forgings are inspected for visible defects such as cold shuts, unfilled sections, rough surfaces and other visible imperfections. Where more exacting inspection is necessary, as for aircraft forgings, magnetic inspection is used to detect invisible surface and subsurface defects. A few representative forgings are generally checked for dimensions to be certain that they are within prescribed limits. Many forging plants that forge alloy steels have their own heat treating furnaces for treatment of forgings to specified requirements.

Flow lines in wrought metals were known and observed for many years and associated with strength and toughness that was known to be inherent in the forging. Only in more recent years has it been demonstrated that proper positioning of the fiber structure in forgings will develop maximum strength for applications where live stresses of shock, impact, and fatigue are encountered. For static loads, position of the flow lines is not of importance but on parts subjected to vibration, impact, shock, and fatigue, improved service is obtained by correct positioning and permitting a continuity of the flow lines throughout the forging length. Maximum live stresses should always be at right angles to the length of the flow lines, in a manner that hard wood might be placed to carry a heavy load. Many test specimens taken in the longitudinal and transverse direction indicate that tensile strength is about the same in either direction but that impact strength, that is, the resistance to impact stresses, is three times as great with proper positioning. Positioning of the fiber structure is of great importance on forged parts that are to be used in aircraft service, many automotive, truck and tractor parts, and other applications where service requirements are rugged. Fig. 14 shows flow lines or fiber structure in various forged parts.

Fast Heating

(Continued from Page 79)

temperatures. In such cases the facets appeared more severe after prolonged heating or after relatively little hot work. Both papers acknowledge that furnace atmosphere is a factor but not an essential one, since Jominy, in an earlier paper, showed that steel may be burned by heating in a vacuum.

Recent work has indicated that facets, with accompanying adverse effect on toughness and ductility, may be produced either by excessive forging temperatures (burning, or fusion of grain boundary metal) or by oxygen penetration and resulting intergranular oxide formation. Of the two, the oxygen penetration seems to be the more serious since it occurs at normal forging temperatures.

Oxygen Penetration—In search of confirmation that intergranular oxides decrease metal flow, an investigation was based upon the premise that the presence of facets was indicative of oxygen penetration. Fig. 5 shows fractures of AISI 4340 bar stock, 1⅝-inch diameter after slow heating to 2350° F. The bar on the left was heated in an oxidizing atmosphere and the bar on the right in a hydrogen atmosphere. After air cooling to room temperature the bars were reheated to 1500° F, oil quenched and drawn at 1000° F. Following this treatment they were nicked and fractured. Since the only variable in heating these test pieces was the atmosphere, it appears reasonable to conclude that the facets occur by penetration of oxygen originating in the atmosphere.

Slow heating permits time for oxygen penetration and oxide formation along certain of the austenite grain boundaries which are coarsened at the elevated temperatures. On subsequent heat treatment the structure is completely refined by recrystallization. However, the oxide film remains undisturbed in its original position established at the high temperature. The fracture follows through the weakened paths provided by the oxides. Appearance of facets is no indication that the steel is coarse grained after heat treatment, but indicates that the intergranular oxide remained undisturbed by the grain refinement which followed its formation.

Fig. 6 shows the influence of atmosphere and temperature upon facet formation with slow heating. While the facets are more pronounced at 2350° F, in the overheated range and with the oxidizing atmosphere, they are still plainly evident at the normal forging temperature with a reducing atmosphere. Fig. 7 shows fractures of bars treated similarly to those in Fig. 6 except for the heat rate. Fast heating, without a soak, resulted in facet-free fractures.

Facets produced by the slow heating in these tests were in bars which were heated to forging temperature but not hot worked. It is quite posble that had some work been performed the facets would not have appeared in the fracture. The metal flow in the hot working would break up the continuity of the oxide film, thus eliminating the plane of weakness necessary for revealing the film, or facet, upon fracturing. In such a case the intergranular oxides have little, if any, influence on room temperature physical properties. Nevertheless, their presence might well account for increased resistance to deformation in the forging operation through increasing internal friction along grain boundaries.

Grain Boundaries — Grain boundaries and the manner in which they function in hot working have been given some emphasis to this point. The extent of the boundaries is determined by the austenite grain size at the end of the heating period. The influence of heating time on grain size is illustrated in Fig. 8. In this instance, bars of AISI 52100 steel were heated to 2100° F. One was heated at the fast rate of 2 minutes

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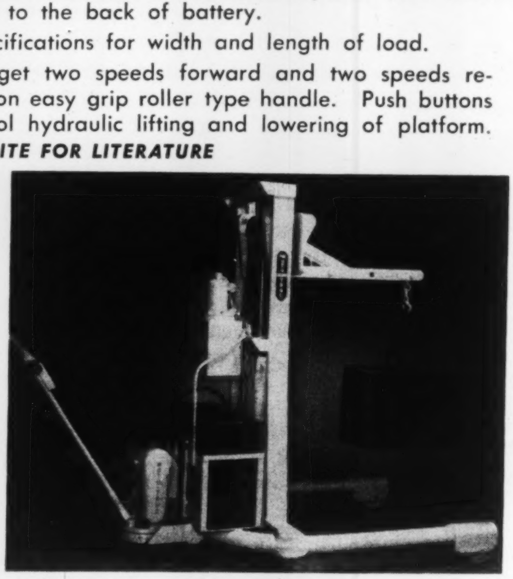

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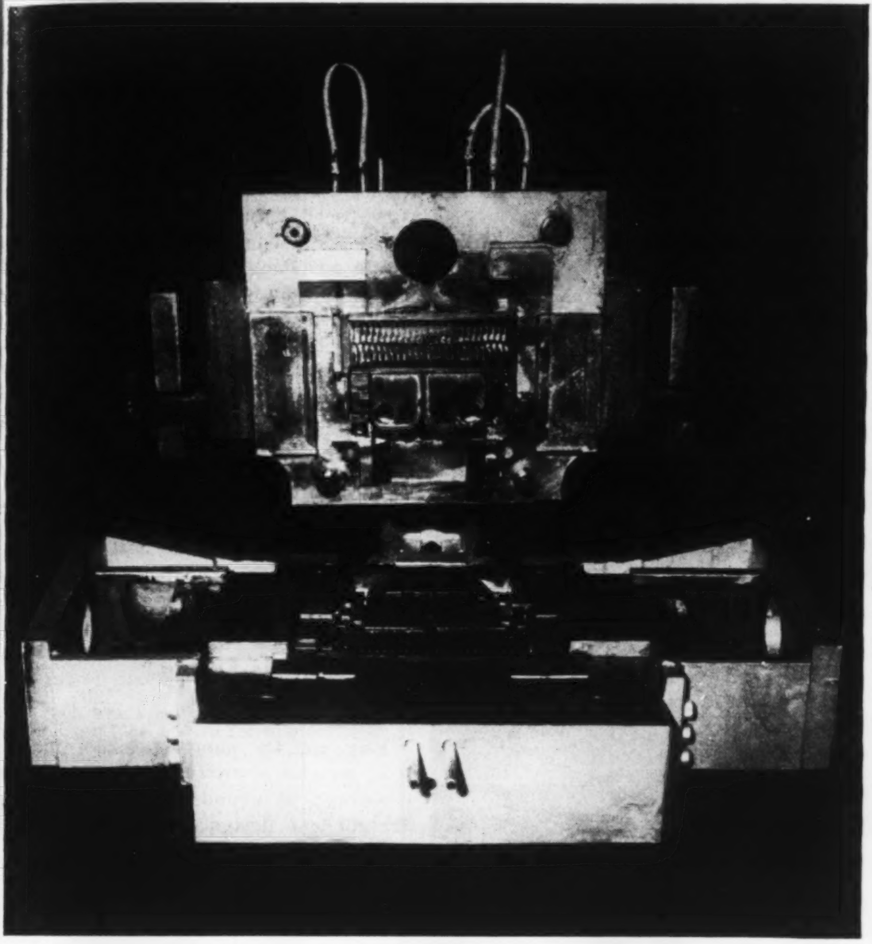
per thickness inch; the other at a slow rate and soaked. Bars were water quenched, nicked and fractured. Differences in grain size are striking. It appears that the fine grain size associated with fast heating is a contributing factor in improving metal flow.

Oxygen penetration which accompanies slow heating and soaking of steel in an atmosphere containing free or combined oxygen may lead to decreased metal flow in still another manner. A decisive influence in shaping and forming is friction of the plastic material on the forming tools or dies. This friction depends primarily upon the surface composition of the plastic material.

Influence of Scale — Influence of scale in decreasing die life and increasing surface friction is well known to the forging industry and all efforts are made to avoid its formation or effect its removal before the hot blank is placed on the dies. The contribution of fast heating to minimizing scale formation has been established. However, fast heating goes even further by minimizing, eliminating in some cases, the occurrence of subsurface oxides which, if present, increase surface friction and resistance to deformation.

To illustrate these subsurface oxides, samples prepared for the microscope were taken adjacent to the fractures of the test bars previously shown in connection with facet formation. The photomicrographs of the bar surfaces are shown in Fig. 9. For detection of oxygen concentration and oxides, an alkaline dichromate etchant was used. This reagent forms an oxide coating on the surface generally, but not in those areas which have been previously oxidized. Surface of the AISI 4340 bar heated according to conventional practice to 2350° F in an oxidizing atmosphere is shown in Figs. 9A and 9B at 100X and 400X magnification, respectively. The white area indicates the oxygen concentration and extends approximately 0.005-inch below the surface. The oxides appear as gray globules. It should be apparent that scale removal prior to forging cannot effectively eliminate these oxides which have become a part of the subsurface metal layer.

An AISI 4340 bar fast heated at a rate of 2 minutes per inch of diameter to 2350° F in an oxidizing atmosphere is shown at 100X magnification in Fig. 9C. In this case, only traces of the oxygen concentration and oxide formation appear at the surface. The surface of the same steel after heating to 2350°F in hydrogen is shown



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at 100X magnification in Fig. 9D. The etch reveals that the elimination of oxygen from the furnace atmosphere resulted in a scale-free surface and subsurface metal that is devoid of oxygen concentration and oxides.

This presentation of evident metallurgical benefits of fast radiant gas heating for forging is based upon field reports and laboratory investigations. The conclusions should be considered as preliminary in view of the nature of the test procedure. The full evaluation of these benefits and the influence upon hot working characteristics and end product properties are subjects of continuing study in the laboratory and in industrial operations.

REFERENCES

1. "High Forging Temperatures Revealed by Facets in Fracture Tests," ASM *Transactions*, Vol. 36, 1946.
2. "Some Aspects of the Overheating of Steel Drop Forgings," *Journal of the Iron and Steel Institute*, No. 1, 1946.

Automobile Spring

(*Concluded from Page* 81)

long and the short leaf 26¾ inches. It weighs approximately 25 pounds against 35 pounds for a comparable eight-leaf design. Each leaf has an as-rolled section thickness of 0.237-0.262-inch, and width of 3½ inches. Sides of the main leaf are tapered at the ends down to the standard 2-inch eye. Thickness of the intermediate leaf, starting at a point about 8 inches from either end, is tapered uniformly by hot rolling down to approximately $\frac{1}{16}$-inch, and the short leaf is similarly thinned, starting at a point about 6 inches from either end.

Conventional springmaking techniques are used, after the taper rolling of the two shorter leaves and the trimming of the ends of the main leaf for width. That is, the proper arc is formed in the leaves by hot quenching in oil, the heated leaves being held rigidly in a fixture until cool. Finally the temper is drawn back slightly and the leaves shot peened on the tension or concave side only to improve fatigue life.

Conventional types of alloy steel are used in the three-leaf spring design. They include SAE 9260, 5160 and Amola-type, and are purchased in hot-rolled flat bar form.

Has G. M. Approval

E. F. HOUGHTON & Co., Philadelphia, has received General Motors Corp. approval of its transmission fluid, type A, for use in automatic transmission and torque converter-fluid coupling systems of automobiles made by that company.

Lime Through Tuyeres

Indicated as method of uniform slag injection to aid blast furnace desulphurization

LIME introduced into the slag within a blast furnace aids desulphurization but the problem is how to get the lime into the slag uniformly and economically. One means of accomplishing this objective, namely, injection of the lime through the tuyeres, was described March 3 to members of the Blast Furnace and Coke Association of the Chicago district.

The presentation was made by George E. Steudel, consultant, A. J. Boynton & Co., Chicago, using detailed plans of a system designed to be capable of injecting 40 tons of lime per day into a 16-tuyere furnace. The speaker stated a blast furnace has two types of slags—bosh slag and hearth slag. Desulphurization takes place between the tuyere line and the hearth, thus the logical move would be to decrease lime content in the bosh slag and increase it in the hearth slag. When such procedure was tried on a Pittsburgh district furnace, production increased and coke consumption decreased.

Tuyere-Injection—According to Mr. Steudel, a more uniform hearth slag is to be obtained when the lime is introduced through each of the tuyeres. In essence, the system he described consists of a lime storage arrangement and a means for getting the material to the tuyeres and blown through them.

In a fully mechanized system, lime crushed to pass through a No. 20 mesh can be automatically unloaded from covered hoppers to be carried by conveyor to a storage hopper. From this hopper, the lime goes by screw conveyor to a 2-inch pipe to each tuyere, each pipe being equipped with its own blower. In a simpler system, lime could be unloaded from bags manually to move by conveyor to the blow pipes, but this would require adding one man per turn. Mr. Steudel asserted that air required for injection would amount to about 5 per cent of total air to furnace.

Several blast furnace operators who participated in the discussion agreed that the injection system appeared to have possibilities and one warned that high sulphur coals eventually may force the use of lime injection equipment. Each speaker, however, apparently cognizant of the substantial investment which installation of the system would require, seemed to hope that the other fellow would be the first to try it on his stock.

Illinois Coke Problem—Midwestern blast furnace operators continue to hope that more coke made from Illinois coal can be utilized in their furnaces. Research has gone on for many years and the subject still is under investigation. A paper on the subject by Charles M. Squarcy, blast furnace engineer, Inland Steel Co., East Chicago, Ind., reported experience with furnace coke containing 25 and 15 per cent Illinois coal with balance Eastern coals.

In general, when Illinois coal is in the coke mix, ash is higher and more coke is required per ton of iron. Illinois coal is high oxygen, and does not lend itself well to storage, consequently, direct use from the car is desirable. Those who have utilized Illinois coal in their coke production agree that good coke can be made providing only comparatively small amounts of Illinois fuel are used in the mix.

Addressing the luncheon on the subject of "Supervisory and Executive Leadership," Dr. Burleigh B. Gardner, University of Chicago, asserted that the executive's job is becoming more complicated, because of technological improvements and a changing world. Leadership has deteriorated and must be rebuilt. The speaker declared that the worker will buck the system if not given an opportunity to advance. A problem of management is to develop enthusiasm for getting the job done.

German Plant Conditions — F. M. Gillies, works manager, Inland Steel Co., East Chicago, Ind., presented a most interesting summary of coke plants and blast furnaces in Germany. Just recently he returned from Europe where he spent several months as chief of steel production for the Army in connection with the zone controlled by England, France and the United States.

Most of the equipment he inspected appeared to be high grade and little of it was damaged by bombing. Carbon hearths are widely used in German blast furnaces and apparently with good results. For the most part, however, refractory tap holes are used. Mr. Gillies stated American steelmakers will be interested in a forthcoming report on what happens when coke ovens are shut down quickly and completely. This happened in Germany and it would appear the consequences were not too great, at least that is the indication so far. In this country, the opinion is that such shutting down would be catastrophic.

CALENDAR
OF MEETINGS

Mar. 20-25, Concrete Reinforcing Steel Institute: Meeting, at The Shamrock, Houston. Institute headquarters are at 38 S. Dearborn St., Chicago.

Mar. 21-22, Steel Founders' Society of America: Annual meeting, Edgewater Beach Hotel, Chicago. Society headquarters are in the Midland Bldg., Cleveland.

Mar. 22-23, Malleable Founders' Society: Market development conference, Evanston, Ill., in co-operation with Northwestern University. Society headquarters are in the Union Commerce Bldg., Cleveland.

Mar. 24, Malleable Founders' Society: Western sectional meeting, Drake Hotel, Chicago, Society headquarters are in the Union Commerce Bldg., Cleveland.

Mar. 28-31, Society of the Plastics Industry: Fourth national plastics exposition, Navy Pier, Chicago. Society headquarters are at 295 Madison Ave., New York.

Mar. 29, Material Handling Institute Inc.: Meeting, Hotel Cleveland, Cleveland. Institute headquarters are at 1108 Clark Bldg., Pittsburgh.

Apr. 3-4, Association of Iron & Steel Engineers: Spring conference, Birmingham. Association headquarters are in the Empire Bldg., Pittsburgh.

Apr. 4-7, National Association of Corrosion Engineers: Sixth annual conference, Hotel Jefferson, St. Louis. Association headquarters are in the Milam Bldg., Houston.

Apr. 5-7, Midwest Power Conference: Sponsored by Illinois Institute of Technology and 18 universities and professional societies, at Sherman Hotel, Chicago. Conference director is Roland A. Budenholzer, Illinois Institute of Technology, 3300 S. Federal St., Chicago.

Apr. 5-7, American Institute of Electrical Engineers: Second conference on electric welding, Rackham Educational Memorial Bldg., Detroit. Institute headquarters are at 33 W. 39th St., New York. Co-operating societies are American Welding Society and Industrial Electrical Engineers' Society of Detroit.

Apr. 10-12, Iron & Steel Division, AIME: 33rd annual conference, Netherland Plaza Hotel, Cincinnati. AIME headquarters are at 29 W. 39th St., New York.

Apr. 10-12, American Society of Lubrication Engineers: Annual convention and show, Hotel Statler, Detroit. Society headquarters are at 343 S. Dearborn St., Chicago.

Apr. 10-14, American Society of Tool Engineers: Industrial exposition, Philadelphia Convention Hall, Philadelphia. Society headquarters are in the ASTE Bldg., 10700 Puritan Ave., Detroit.

Apr. 11-12, American Zinc Institute: Meeting, Hotel Statler, St. Louis. Institute headquarters, 60 E. 42nd St., New York.

Apr. 12-14, National Petroleum Association: Meeting, Hotel Cleveland, Cleveland. Association headquarters are in the Munsey Bldg., Washington.

Apr. 12-14, American Society of Mechanical Engineers: Spring meeting, Hotel Statler, Washington. Society headquarters are at 29 W. 39th St., New York.

Apr. 13-14, American Machine Tool Distributors' Association: Meeting, Edgewater Beach Hotel, Chicago. Association headquarters at 505 Arch St., Philadelphia 6.

Apr. 14-15, Ohio State Welding Engineering Conference: Conference on economy in design and production. Make reservations with sponsor, welding engineering department, Ohio State University, Columbus 10. Downtown headquarters at Fort Hayes Hotel, Columbus.

Apr. 17-19, Society of Automotive Engineers: Aeronautic meeting and aircraft engineering display, Hotel Statler, New York. Society headquarters are at 29 W. 39th St., New York.

Internal Corrosion a Problem

ABLE to penetrate considerable thicknesses of any material, the high-energy particles and radiations emitted from an atomic energy plant nuclear reactor may change the arrangement of the atoms of which a structure is made, and materially alter its physical properties. Speaking before the Fort Wayne, Ind., section of the American Institute of Electrical Engineers, Harry E. Stevens of Knolls Atomic Power Laboratory, operated by the Research Laboratory of General Electric Co., Schenectady, N. Y., for the Atomic Energy Commission, stated that this internal corrosion is a problem which must be guarded against as ordinary rusting must be precluded in all engineering work.

A structural material that may be entirely satisfactory for ordinary engineering uses might be made unfit for prolonged operation in an atomic power plant, he stated. The wrong structure material could have an adverse effect in another way if much of the atomic plant structure acts as a neutron blotter, a function which is reserved for the control rods in the reactor. The neutrons maintain the chain reaction by which atomic energy is reduced and the control rods keep the reactor from running away by soaking up these neutrons much in the manner of a blotter soaking up water.

Such considerations, the speaker declared, make the engineer consider strange new structural materials, these in turn raising a new array of procurement problems. Shields to protect personnel in the vicinity of a reactor from the radiations emitted must be thick enough to reduce the ray intensity by many thousands of times. If concrete is used, it must be many feet in thickness, he reported. It is speaker's opinion that many other materials may be used as shield materials and a reduction in shield size is to be expected by the proper choice of various combinations.

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TRUCK-ON-TRUCK: To get an urgently needed fire fighting apparatus pump aboard an air transport posed a problem for the American-LaFrance Foamite Corp., Elmira, N. Y., at that city's airport. The plane's freight door was 8 feet above the ground, the job could not be done manually, and the air terminal lacked the necessary handling equipment. Problem was solved by driving one of the company's fork-lift trucks, made by Clark Equipment Co., Battle Creek, Mich., into one of its service department trucks, then transporting the load to the plane. The job could have been done from the ground, had it been possible to get the industrial truck from the auto truck. Performed with no delay to the air schedule, the pump started on its winged journey to Havana, Cuba

LETTERS
to the Editors

You Benefit Again

We have for many years been a subscriber for your wonderful publication and have benefited tremendously by its contents. At this time we should very much appreciate it if you would develop for us a list of steel producers in Belgium, France, Germany and Luxemburg. We are interested in the names of producers of the following items: Beams, angles, channels, plates, sheets, rounds, flats, reinforcing bars, wire rope, chain link industrial steel fencing and posts for same, nails.

B. H. Kline
General Manager
Kline Iron & Metal Co.
Columbia, S. C.

Our lists of foreign steel producers is not broken down in such a fashion to permit the compilation you desire. We suggest you write Iron & Coal Trades Review, 49 Wellington St., Strand, London, England, publishers of Rylands Directory which lists all iron and steel producing companies in Europe.—The Editors

Shaving With a Coin

Referring to the Feb. 27 issue of your paper, page 33, who makes the electric shaving gadget?

W. Wallace McKaig
President & General Manager
Cumberland Steel Co.
Cumberland, Md.

Manufacturer of the latest means of increasing barber unemployment is A. H. Pitchford Co., 5 Craig Court, Pittsburgh 16, Pa. We know of no coin-operated hair cutter, however.—The Editors

Trademark Registered?

The Carborundum Co. suggested that we write to inquire whether you know if the following names have been used as a trademark: Amlox, Matlox. If you do not have this information available, will you advise where we could obtain it.

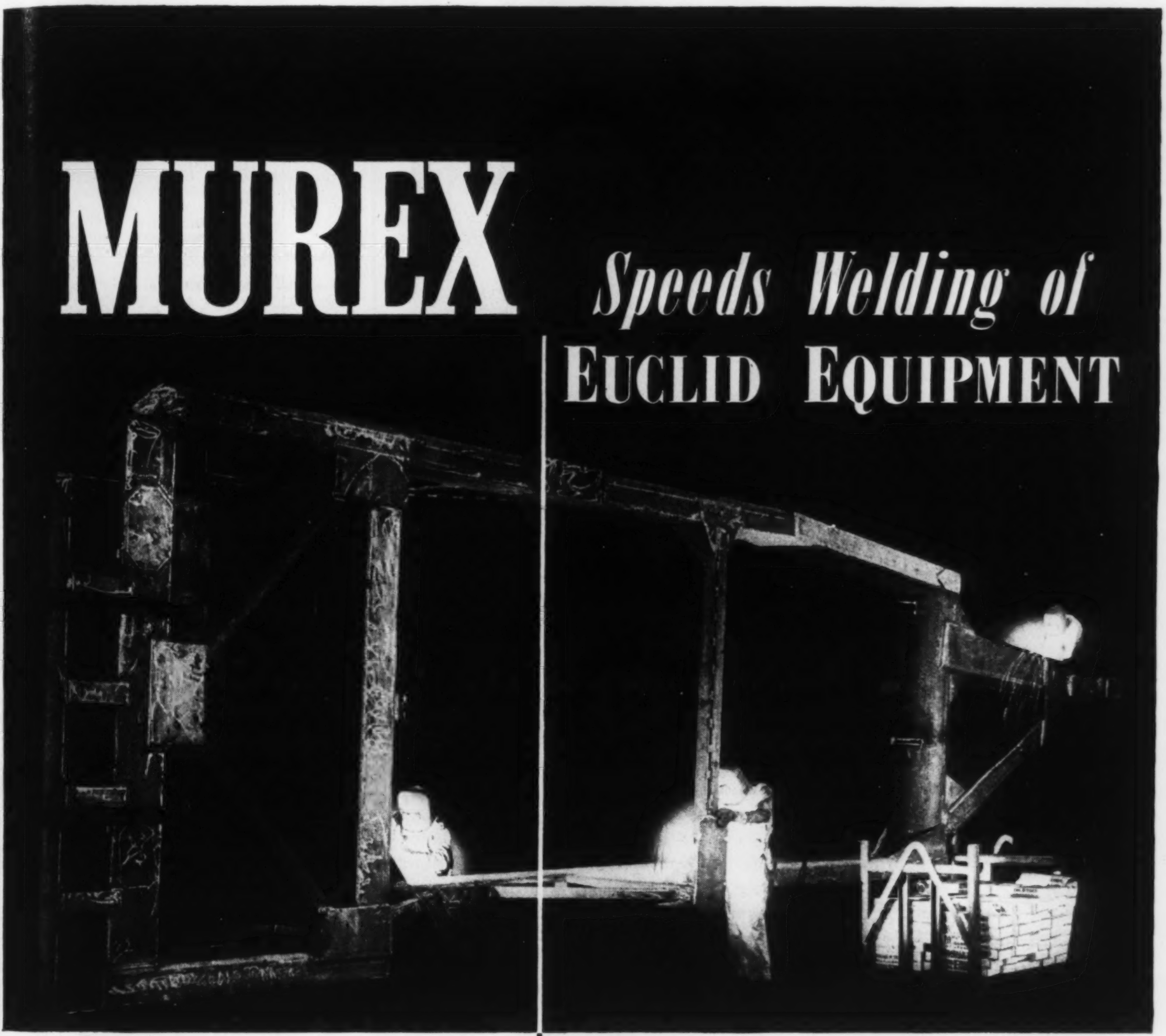
R. P. Spooner
American Abrasive Metals Co.
Irvington, N. J.

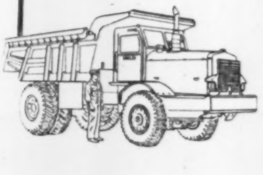
As far as we know, the names have not been used as trademarks or tradenames. None of our sources list either name. Inasmuch as there are many such names of which we have no record, it is suggested that you write the Executive Examiner for Trade Mark Operations, United States Patent Office, Washington, D. C.—The Editors

Small Assembly Lines

We are particularly interested in gaining all the information possible on assembly lines used in small manufacturing plants. We are not at all interested in the systems used in large manufacturing plants, such as the automobile companies and electrical units for household purposes.

MUREX *Speeds Welding of* EUCLID EQUIPMENT





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Available natural, planished and buffed, it serves both as the final product finish, or as a ready base for further plating. Its use often eliminates costly batch plating and buffing of formed and drawn parts.

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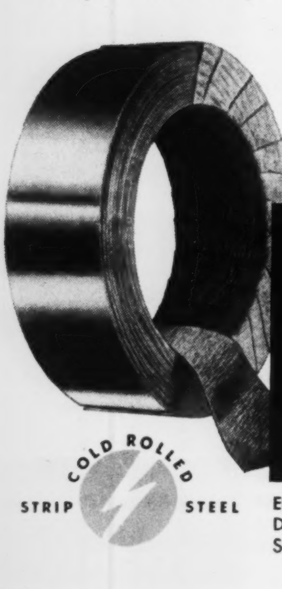

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We would like to put in an assembly line used for assembling about 50 machines at a time. We understand that there are a number of methods. The ones we have learned the most about are individual trucks which move down the line on tracks or some sort of a conveyor which carries the units.

L. C. Finnell
Vice President-Treasurer
Finnell System Inc.
Elkhart, Ind.

Tearsheets of STEEL articles appearing in March 7, 1949 and April 28, 1947, issues are being sent; they show two systems of towing individual trucks around a plant floor. Jervis B. Webb Co., 8951 Alpine Ave., Detroit 4, Mich. makes this type of equipment. Another method of assembly is on conveyor belts. Some of the many manufacturers of this equipment are: Logan Co., 1115 Franklin St., Louisville 6, Ky.; Mathews Conveyor Co., 212 Tenth St., Ellwood City, Pa.; Robins Conveyors Division, Hewitt-Robins Inc., Passaic, N. J.; Standard Conveyor Co., 940 Indiana Ave., North St. Paul, Minn.; Steel Parts Mfg. Co., 226 S. Morgan St., Chicago 7, Ill.; Link-Belt Co., 300 West Pershing Rd., Chicago, Ill.; Lamson Corp., 303 Lamson St., Syracuse, N. Y.—The Editors

Supersonic Scale Removal

We would like some information relative to the application of supersonics to the removal of scale from steel and whether this actually takes the place of pickling or acts as a scale breaker. We are in hopes that you can help us on this.

S. L. Johnson, Supervisor
New Methods Developments
Division
Minnesota Mining & Mfg. Co.
St. Paul, Minn.

Our Production and Engineering News at a Glance page in the Nov. 21, 1949, issue carried an article on ultrasonic degreasing research being carried on by Massa Laboratories Inc., Cleveland. Your request for information is being passed on to that company.—The Editors

Savings

In the Jan. 9, 1950, issue of STEEL magazine there is an article entitled "Man-Hour and Material Savings Effected by Resistance Welding Jet Engine Components," which is of interest to us. For future reference we would like to obtain a copy of this article.

J. Schettler
Tooling & Development Dept.
MacDonald Bros. Aircraft Ltd.
Winnepeg, Canada

Copy of the article, detailing operations at Solar Aircraft Co., San Diego, Calif., is being sent.—The Editors

Shot of Cut Wire

We are enclosing a photostatic copy of the Mirrors of Motordom page, which appeared in the Feb. 6, 1950, issue of STEEL. Will you kindly advise where the SAE 1065 cut wire shot referred to can be obtained? We would appreciate to have you advise us the name and address of the manufacturer of this product.

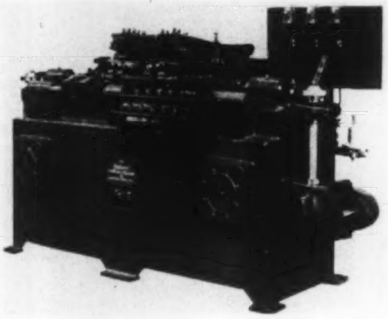
E. A. Ring
Kohler Co.
Kohler, Wis.

Cut wire shot is made by Pellets Inc., 27 Military Rd., Buffalo, N. Y. and Cleveland Metal Abrasive Co., 880 E. 67th St., Cleveland 8, O.—The Editors

New Products and Equipment

High Speed Flash Welder

Quick acting pneumatic clamping with trunnion-mounted double-acting air cylinders and adjustable, self-aligning upper dies furnishing 7000 pounds clamping pressure are incorporated in the design of a heavy duty 75 kva special dual flash welder built by Federal Machine & Welder Co., Warren, O. It has a compact drive which uses a standard Cone-Drive double-enveloping geared 40-to-1 speed reducer of 4-inch center distance. A double extended output shaft facilitates power transmission to upset cams at each end of the welder. Machine is completely automatic in its cycle, except for loading and unloading.



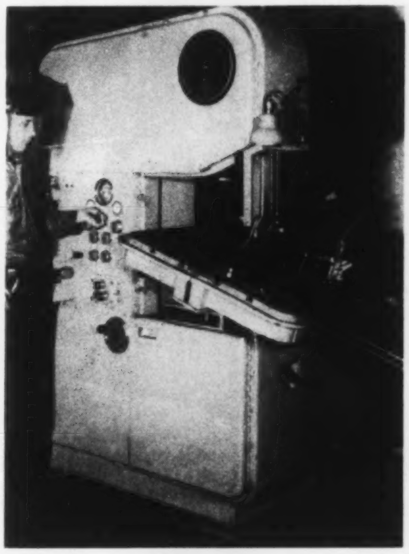
Designed for high-speed fabrication of wringer-roll assemblies, the machine has a 2 hp, 440 v, 1200 rpm, 60 cycle motor equipped with Reeves variable speed pulley and solenoid-operated brake for accurate control of welding and upset cycle. Eight-point heat controls are provided for both welds. Maximum upset force of 4500 pounds at each end.

Check No. 1 on Reply Card for more Details

Performs Band Machining

DoAll Co., Des Plaines, Ill., is introducing the Contour-matic machine which performs line milling and line grinding operations in the band machining of hard, abrasive and tough material. Process involves the use of new types of band cutting tools. Machine is completely hydraulic in operation and control of tool speed, work table feed, tool post, table tilt, blade tension and brakes. Operation is controlled from a central panel. Infinite stepless speed range from 40 to 10,000 fpm and 27 band cutting tools permit sawing, milling, filing, grinding, honing and polishing operations.

For line milling operations, a band cutting tool with tungsten carbide-tipped teeth is used. With controlled work feed and pressure, cutting rates are doubled with considerably longer tool life. Pressure blade lubrication is provided. The line milling band tool withstands high frictional temperatures encountered at the tooth tip. The line grinding and honing blade is a tough alloy band on which cubical molded abrasive matrices are welded in the form of teeth. In its cutting action there is an equalized balance between bonding and abrasive grits which gives a constant degree of abrasive exposure. Blade is offered in 54, 60, 70 and 80 grit. Coolant must be used with this blade.



Check No. 2 on Reply Card for more Details

Reaches Inaccessible Places

A long low-clearance handle on the series D rotary floor Magnetool offered by Multifinish Mfg. Co., 2114 Monroe Ave., Detroit 7, Mich., permits the operator to pick up steel chips from places which are hard to reach. A clearance of only 2¾ inches is required. Magnet is of the permanent type and is sealed in a tube.

Magnetool is propelled in carpet sweeper fashion, steel parts loading automatically over the entire 360 degrees of magnetic surface. Unloading is by means of a Neoprene wiper ring which pushes parts to a non-magnetic area at each end. Inertia brakes prevent roll when the unit is not in use.

Check No. 3 on Reply Card for more Details

Microscope for Toolmakers

Range of measurement is 6½ inches and workpiece may be surveyed in co-ordinates up to 6½ x 6½ inches with the measuring toolmaker microscope offered by Boeckeler Instrument Co., 31 E. Rillito St., Tucson, Ariz. Instrument's stage is fitted with railings against which the workpiece can be placed. These are at 90 degrees to each other to a high degree of accuracy. Angular measurement is made by linear determination plus shop trigonometry.

A protractor eyepiece may be fitted at extra cost. Overall magnification is about 32X. Illumination is adequate for magnification used. Lighting adjustment is for shadowless lighting of objects. Crosshairs provided are at an angle of intersection at 60 degrees, this having been found the most generally useful.

Check No. 4 on Reply Card for more Details

Welds Thin Tubing

Principle of the model 1000 tube welder, offered by Electrical Maintenance & Engineering Co., 12525 Euclid Ave., Cleveland 12, O., is to feed the curled tube passed the power support bar and water entrance tubes through the guide and into the funnel. Then the push-rod mechanism on the ram forces the tube through the sizing funnel under the welding wheel and out through the no-back stripper. The ram with mandrel attached then pulls out of the tube and picks up the next tube on the return stroke.

Machine is capable of welding 2 to

IT'S THE RESULTS YOU GET, THAT COUNTS!

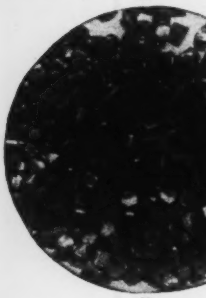
20th Century

DRAWN STEEL Shot

• NEWEST DEVELOPMENT FOR BETTER AND MORE ECONOMICAL PEENING AND BLAST CLEANING.

BETTER because the pellet size and mass remain uniform many times longer than with other types of shot. And it is extremely durable, outlasting conventional hard iron shot 8 to 1 and cast steel shot at least 2 to 1.

MORE ECONOMICAL. Abrasive purchases are greatly reduced, there is less freight and freight handling cost, and less equipment wear and maintenance.



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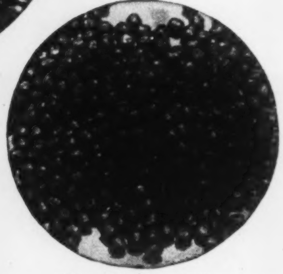

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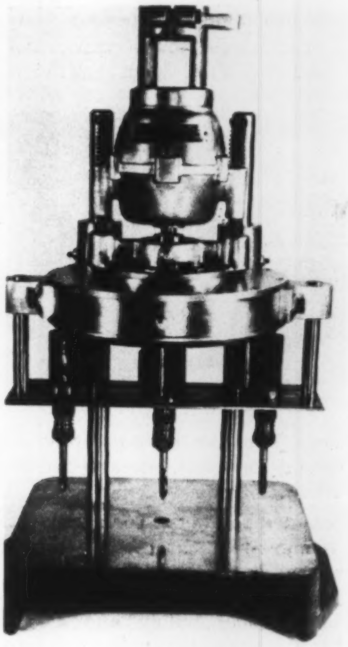
Main Office and Plant: 880 East 67th Street, Cleveland 8, Ohio
Howell Works—Howell, Michigan

3-inch tubing in lengths from 12 to 31 inches. Material may be 1020 to 1045 steel or stainless steel of 0.10 to 0.025-inch in thickness. Tolerance must be 0.010-inch on the diameter.

Check No. 5 on Reply Card for more Details

Multiple Drilling Head

An adjustable spindle multiple drill or tapping head made by Ettco Tool Co. Inc., 594 Johnson Ave., Brooklyn 6, N. Y., for any type of drill press will drill or tap parts with hole sizes up to and including 5/16-inch in steel. Rapid and accurate spindle adjustment may be made from a minimum center distance of 1 1/16 inches to a maximum center distance of 7⅝ inches. Spindle of the Ettco-Emrick head can be located at any point within a 3 5/16-inch diameter circle.



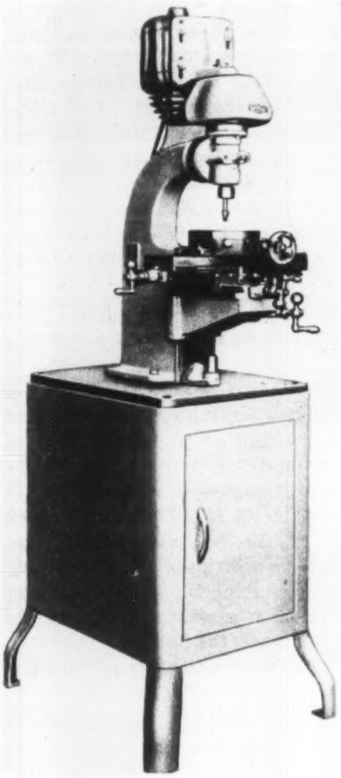
Template method makes spindle location a simple operation. Change of location from one drilling or tapping operation to another is performed rapidly. The bed plate components are tied together similar to a punch and die, therefore maintaining inbuilt accuracy and alignment. Heads are offered with two, three, four or five spindles.

Check No. 6 on Reply Card for more Details

All Vertical Milling Machine

Built to hold tolerances up to 0.001-inch is the No. 1 vertical milling machine with an adjustable head, built by Columbia Enterprises Inc., Grayslake, Ill. Milling, drilling, boring and routing may be performed at any angle as the swivel head turns on a 180 degree radius. Spindle is equipped with tapered Timken roller bearings which maintain spindle alignment and carry radial and thrust loads.

Machine has provision for a wide variety of spindle speeds. Standard



unit is a bench model arranged for motor drive and furnished with motor pulley and V-belt. Optional equipment include floor stand with built-in cabinet, 6-inch layout table and swivel vice.

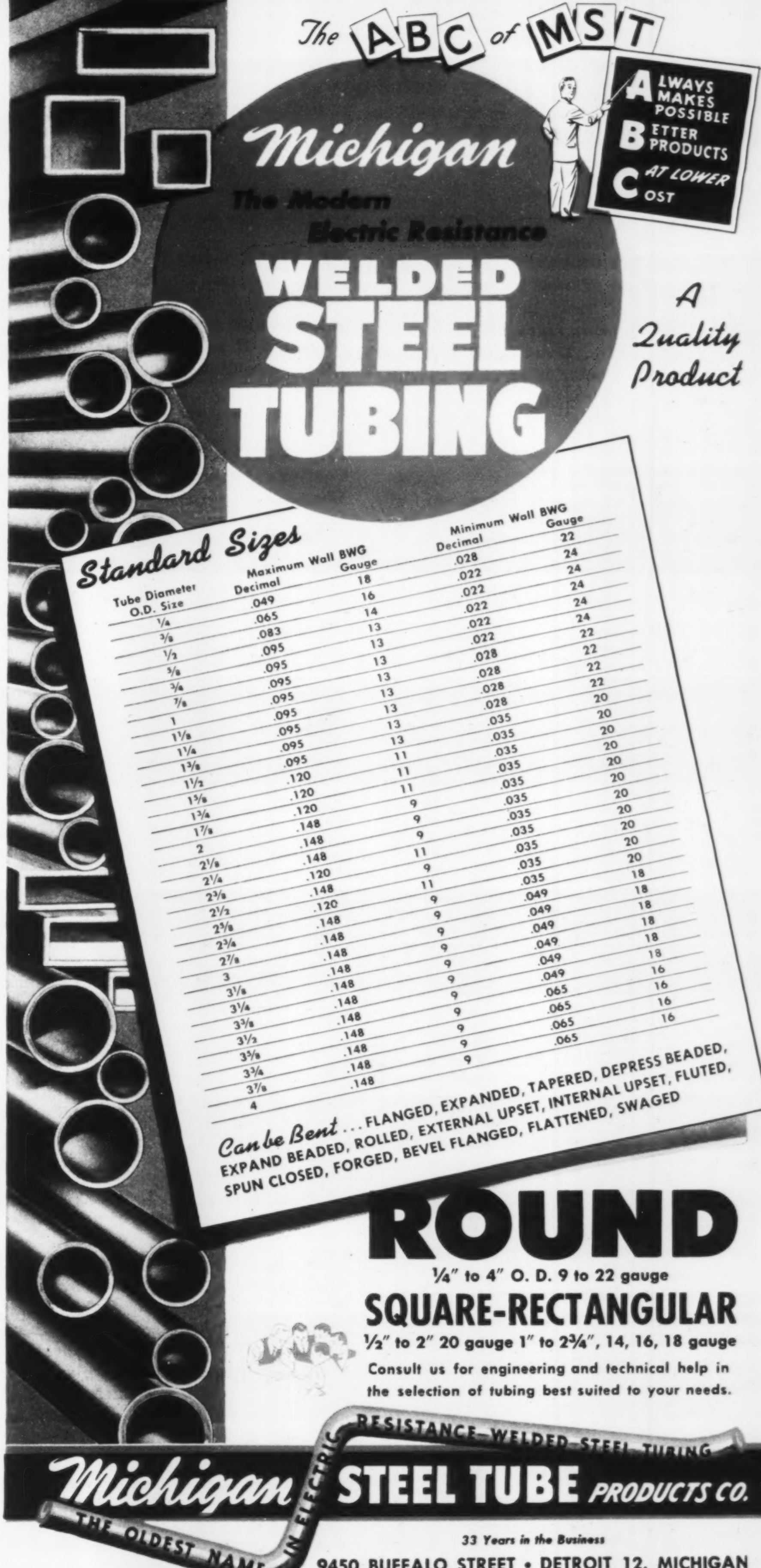
Check No. 7 on Reply Card for more Details

• • •

LARGE VOLUME BLOWERS: North American Mfg. Co., Cleveland 5, O., has added seven new sizes to its 300 series blower line. These additions are of large volume, low pressure type and come in either single or two stage units. They may be obtained in the directly connected style or with V-belts transmitting power from motor to blower impellers through a jackshaft.

Check No. 8 on Reply Card for more Details

AIR HANDLING UNITS: Intended primarily for remote installation in central plant type air conditioning systems, a new line of air handling units is announced by Westinghouse Electric Corp., Pittsburgh 30, Pa. Designated as types AH and AV, units can also be used for commercial and industrial heating and ven-



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ALWAYS MAKES POSSIBLE BETTER PRODUCTS AT LOWER COST

Michigan
The Modern Electric Resistance
WELDED STEEL TUBING

A Quality Product

Standard Sizes

Tube Diameter O.D. Size	Maximum Wall BWG Decimal	Maximum Wall BWG Gauge	Minimum Wall BWG Decimal	Minimum Wall BWG Gauge
1/4	.049	18	.028	22
3/8	.065	16	.022	24
1/2	.083	14	.022	24
5/8	.095	13	.022	24
3/4	.095	13	.022	24
7/8	.095	13	.022	24
1	.095	13	.028	22
1 1/8	.095	13	.028	22
1 1/4	.095	13	.028	22
1 3/8	.095	13	.028	22
1 1/2	.095	13	.035	20
1 5/8	.120	11	.035	20
1 3/4	.120	11	.035	20
1 7/8	.120	11	.035	20
2	.148	9	.035	20
2 1/8	.148	9	.035	20
2 1/4	.148	9	.035	20
2 3/8	.120	11	.035	20
2 1/2	.148	9	.035	20
2 5/8	.120	11	.035	20
2 3/4	.148	9	.035	20
2 7/8	.148	9	.049	18
3	.148	9	.049	18
3 1/8	.148	9	.049	18
3 1/4	.148	9	.049	18
3 3/8	.148	9	.049	18
3 1/2	.148	9	.049	18
3 5/8	.148	9	.065	16
3 3/4	.148	9	.065	16
3 7/8	.148	9	.065	16
4	.148	9	.065	16

Can be Bent ... FLANGED, EXPANDED, TAPERED, DEPRESS BEADED, EXPAND BEADED, ROLLED, EXTERNAL UPSET, INTERNAL UPSET, FLUTED, SPUN CLOSED, FORGED, BEVEL FLANGED, FLATTENED, SWAGED

ROUND
1/4" to 4" O. D. 9 to 22 gauge

SQUARE-RECTANGULAR
1/2" to 2" 20 gauge 1" to 2 3/4", 14, 16, 18 gauge

Consult us for engineering and technical help in the selection of tubing best suited to your needs.

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THE OLDEST NAME IN ELECTRIC
Michigan STEEL TUBE PRODUCTS CO.

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tilating. Sizes range from 1650 to 14,060 cfm at 500 feet per minute coil face velocity when direct expansion coils are used and up to 18,000 cfm when water coils are used. Standard and double tube steam heating coils are also available.

Check No. 9 on Reply Card for more Details

MEASURES GRAVITY: For measuring gravity of mold or core coating materials, a new pencil-sized hydrometer is being marketed by Harry W. Dietert Co., Detroit, Mich. Body of the hydrometer is of clear plastic and the Beaume scale is enclosed within the body.

Check No. 10 on Reply Card for more Details

LOCKS IN POSITION: Designed for locking the various makes of ball and roller bearings in correct position on shafts of 5/16 to 7 11/16-inch diameter, a new line of locknuts and lockwashers is offered by Link Belt Co., Chicago 1, Ill. They are easy to install and remove, rust resistant and vibration proof.

Check No. 11 on Reply Card for more Details

CLEANS UNDERGROUND: Known as the Homestead-Yeager all-electric steam cleaner, Homestead Valve Mfg. Co., Coraopolis, Pa., introduces the unit for use underground or wherever gaseous or explosive mixtures have made cleaning impractical. It is electrically heated and powered and removes grease, dirt and other deposits from machinery, equipment, floors, etc.

Check No. 12 on Reply Card for more Details

MEASURES DENSITY, GRAVITY: A new line of Pycnorator instruments for measurement and control of fluid density and specific gravity is introduced by Fischer & Porter Co., Hatboro, Pa. Designs available include submerged float instruments for use in vessels under pressure or vacuum, open bubblers, closed diaphragm and hydraometer types.

Check No. 13 on Reply Card for more Details

CADMIUM BRIGTHENER: ROHCO 20XL cadmium brightener, offered by R. O. Hull & Co. Inc., Cleveland 13, O., gives uniformity of deposit thickness, brilliance of deposit over widest bright current density plating range and maximum production from barrel units.

Check No. 14 on Reply Card for more Details

FOR HARD TO HANDLE LIQUIDS: Designed for hard to handle liquids and gases, a new line of solenoid valves is introduced by Charles Engelhard Inc., East Newark, N. J. Valves are hand made and engineered for precision seating insuring tight shutoff and trouble free operation for life of valve. Units are mounted vertically with solenoid on top. Power supply can be alternating or direct current.

Check No. 15 on Reply Card for more Details

MULTIPLE V-BELT: A new high capacity multiple V-belt with a 40 per cent increase in horsepower rating, is announced by B. F. Goodrich Co., Akron, O. It is also available for use where dissipation of static is essential.

Check No. 16 on Reply Card for more Details

PROTECTIVE COATING: Specialty Coatings Laboratory, Milwaukee 2, Wis., has developed a removable protective vinyl coating designed to prevent corrosion, scratching or abrasion of metals during production, assembly, shipping or storage. It is applied by spray, brush or dipping and is available clear or in both translucent and opaque colors.

Check No. 17 on Reply Card for more Details

NONMETALLIC CLEANING ABRASIVE: Known as Black Beauty, a new abrasive replacing silica sand for blast cleaning and finishing operations, has been developed by American Wheelabrator & Equipment Corp., Mishawaka, Ind. It is nonmetallic, noncorrosive and retains its abrading qualities even when reduced to very fine material.

Check No. 18 on Reply Card for more Details

RING THREAD GAGE: Republic Gage Co., Detroit 21, Mich., offers a titanium solid ring thread gage. Ring is of the insert type with knurled aluminum collar. It also has inherent self-lubricating properties. Rings solve the problem of providing a functional method of checking male threads with gage wear reduced to a negligible amount.

Check No. 19 on Reply Card for more Details

MAINTAINS FLOW RATIO: No. 235 adjustable lift opening, lever operated control valve, made by Atlas Valve Co., Newark, N. J., is recommended for use in any process where the flow of two fluids must be kept within a certain ratio. Seats are provided in steps of 1/16-inch diameter in single seated valves and steps of ⅛-inch diameter in double seated valves.

Check No. 20 on Reply Card for more Details

FOOT POWERED PUMP: For use on drill press, tapping machine, milling machine or bench, a new coolant supply unit is introduced by W. A. Horejsi Co., Minneapolis, Minn. Stroke of the foot pedal on the pump controls amount of lubricant or fluid delivered to the cutting tool. Lubri-King unit consists of a heavy steel tank, holding about 2 gallons of lubricant, equipped with a foot pump, 5 feet of plastic hose and nozzle attachment.

Check No. 21 on Reply Card for more Details

MINIATURE CYLINDERS: Micro model cylinders for use in small jigs and fixtures where size and space limitations are primary factors are available from Air-Mite, Chicago 12, Ill. They are machined from solid brass bar stock and deliver 75 pounds thrust on a 100-pound line pressure. Stroke is ⅝-inch with equal ram pressure at any stroke point.

Check No. 22 on Reply Card for more Details

PORTABLE CRIMPING TOOL: Designed for crimping metal ferrules when making on the job hose repairs or installations, a new portable ferrule crimping tool is available from A. Schrader's Son Division, Brooklyn 17, N. Y. As the crimping medium, it utilizes two strands of music wire in loop form attached to operating handles in such a way that closing handles contract the loops.

Check No. 23 on Reply Card for more Details

ROLL MARKING DIE HOLDER: Known as Parker 100 series, the new holders developed by Parker Stamp Works Inc., Hartford, Conn., are machined and soft ground of a very tough alloy steel, then hardened throughout and finished ground on those surfaces which come in contact with the segement inserts when assembled. The patented taper-lock feature assures positive locking and self-centering of any type combination in the longitudinal direction.

Check No. 24 on Reply Card for more Details

HOUSING FOR COMPRESSORS, PUMPS: An improved housing for their heavy duty pumps and compressors is announced by Gast Mfg. Corp., Benton Harbor, Mich. Although the housing has less overall height and is more compact, mounting dimensions have not been changed so that new models are interchangeable with older models.

Check No. 25 on Reply Card for more Details

FOR MORE INFORMATION

on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Helpful Literature

74. Riveted Roller Chains

Chain Belt Co.—8-page illustrated bulletin No. 50-6 describes Baldwin-Rex BA riveted roller chain assembly consisting of standard riveted roller chain with special single pin connector link. Connector has pin which can be driven out easily to assemble or disassemble chain.

75. V-Belt Drives

Rockwood Mfg. Co.—20-page illustrated data book No. 1049 covers V-belt drives in sizes from fractional to 350 hp. Semisteel sheaves with split taper bushings, offset keystocks and pivoted motor bases are also described. Method of determining proper type and size of drive for specific service is related.

76. Portable Floodlight

Natale Machine & Tool Co.—8-page illustrated publication "New Circle D-150 Emergency Portable" deals with portable floodlight having spring mounted Mogul socket which firmly holds 200, 300 or 500-w Hi-Flood Sealed Beam Lamp against gasket ring of heat and moisture resistant asbestos.

77. Speed Reducer

Dodge Mfg. Corp.—16-page illustrated brochure presents cutaway views, technical data and prices of Torque-Arm speed reducer which is available in six sizes with capacities to cover wide range of drives up to 25 hp. It consists of reducer with fixed ratio of 15:1 driven by motor through V-belt drive.

78. Grinding & Polishing

Behr-Manning—8-page illustrated form No. 714 depicts how Metalite cloth belts have facilitated backstand grinding and polishing operations when used in conjunction with modern contact wheels. Typical examples are given of backstand conversion installations throughout various industries.

79. Nonferrous Castings

Wellman Bronze & Aluminum Co.—16-page illustrated catalog No. 50 describes facilities for making patterns and nonferrous castings. Other subjects include polishing of aluminum, production of magnesium and aluminum alloys, copper-base alloys, Ampco metal and physical and mechanical properties of cast metals.

80. Alloy Steel Selection

Carpenter Steel Co.—12-page illustrated bulletin deals with Nos. 158 and 5-317 chrome-nickel alloy steels of carburizing and hard-tempering types, respectively. Physical properties, stock sizes available, typical uses and working instructions for each type are enumerated.

81. General Purpose Hoists

American Hoist & Derrick Co.—16-page illustrated catalog No. 100H-55 explains details of general purpose hoists available in 5500 to 10,000-lb single line pull capacities and rated from 50 to 100 hp. Among features are electric welded base, solid unslotted alloy steel shafts, balanced drums and cut steel gears.

82. Instrument Panels

Hays Corp.—8-page illustrated bulletin No. 773 explains how instrument and control panels are made and where they are used. Particular features including electric clocks, pressure gages, transformers, nameplates, pushbutton stations and signal lights are discussed also.

83. Centralized Lubrication

Farval Corp.—16-page illustrated bulletin 25 describes positive mechanical method of delivering oil or grease under pressure to group of bearings from one central station in exact measured quantities. System consists of central pumping unit located at safe point at floor level, two main supply lines and Dualine measuring valve for each bearing.

84. Vertical Turbine Pumps

Layne & Bowler, Inc.—32-page illustrated bulletin 4-42 presents line of vertical turbine pumps built for wells ranging in diameter from 4 to 36 in. and in capacities from 50 to 16,000 gpm. Bowls for special service are available for almost any capacity. Publication depicts and describes product application and design features.

85. Testing Machine

Baldwin Locomotive Works — 4-page illustrated bulletin No. 305 gives details on Baldwin-Tate-Emery PTE testing machine having ranges from 0-2 lb full scale to 5000-lb capacity. Loading system; accuracy; specifications and accessories such as grips, strain followers and recorders are covered.

86. Magnetic Starter

Arrow-Hart & Hegeman Electric Co.—4-page illustrated folder "New Magnetic Starter" deals with type RA size 2 magnetic starter having right-angle balanced mechanism which multiplies 15-lb magnet pull to 25 lb at contacts, requiring but 8.5 w closed and 75 w inrush.

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87. Double-Stroke Header

Waterbury Farrel Foundry & Machine Co.—14-page illustrated temporary circular No. 102-A-2 presents complete information on Hi-Pro steel, solid die, double-stroke crank machine capable of making wide variety of upset or cold-headed articles. Machine is well guarded, compact and rigid in design and is provided with automatic lubrication, roller bearings and safety devices.

88. Aluminum Casting Alloys

American Smelting & Refining Co., Federated Metals Div.—40-page illustrated booklet "Aluminum Casting Alloys" contains section on pouring, shrinkage, dross control, solution treating, aging, stress relief, corrosion, test bars, gas absorption and effect of moisture. Metallurgy of aluminum casting alloys is described in detail, and specifications are tabulated.

89. Ferrous Castings

Belle City Malleable Iron Co., Racine Steel Castings Co.—4-page illustrated folder No. 9 is descriptive of custom casting service offered. Five types of ferrous castings are available: high and low carbon and alloy, high strength malleable, pearlitic malleable and electric furnace iron.

90. Metal Cutters

H. K. Porter, Inc.—8-page illustrated folder 503 covers Power line of special-purpose hand tools for cutting bolts and screws, form wires, bar stock, chain, nuts, wire rope and cable, electric wire and rods. Commonly used types are depicted and their features, specifications and uses listed.

91. Bench Type Punch Presses

Klaas Machine & Mfg. Co.—4-page illustrated bulletin BC discusses features and applications of Emco models W and X bench type power punch presses that can perform 18,000 and 9000 operations per hour, respectively. Machines will punch any metal that can be pierced and can be used also for forming, stenciling and riveting.

92. Roller Conveyors

Standard Conveyor Co.—12-page illustrated bulletin No. 67 depicts gravity and power operated roller conveyors handling flat sheet steel; moving coils of steel and transporting materials in brass mills, airplane parts plants, foundries and other plants. Pneumatic tube service in airplane plant is discussed and illustrated also.

93. Transmission Belting

B. F. Goodrich—4-page illustrated catalog section No. 2100 outlines method of making belts endless by Plylock belt joint and discusses various types of rubber transmission belting. Listed also are recommended uses and specifications.

94. Rust Preventive Wrap

Angier Corp.—24-page illustrated publication presents industrial applications of VPI Wrap vapor phase inhibitor to prevent rust. Shown are numerous installations that employ this simplified method of packaging domestic and export shipments of steel and aluminum parts.

95. Aluminum Cleaner

Diversey Corp.—4-page illustrated bulletin No. 49C deals with Diversey No. 36 cleaner for removing forming oils, drawing lubricants, quenching oils, identification inks, and polishing and buffing compounds from aluminum without etching or discoloration.

96. Gas-Electric Power Plant

Ready Power Co.—8-page illustrated bulletin No. 99 depicts numerous applications of compact gas engine generator sets that produce power to operate electric industrial trucks, tractors, cranes and industrial locomotives.

97. Stainless Steel

Crucible Steel Co. of America—4-page illustrated folder on Rezistal 303 stainless steel presents technical data on this nonhardenable austenitic chromium nickel steel to which elements have been added to improve machinability and nongalling characteristics.

98. Carbide Header Die Nibs

Carboloy Co.—Illustrated bulletin No. D-4 lists specifications and prices of 17 different sizes of carbide header die nibs carried in stock in rough cored state. Also available is leaflet on assembly, finishing and maintenance of these die nibs.

99. Ornamental Grilles

Harrington & King Perforating Co.—48-page illustrated catalog presents large selection of ornamental grille patterns having fixed and movable louvers, Grilframes, special panels and enclosures.

100. Gear Hobbing Machines

Gould & Eberhardt, Inc.—28-page illustrated catalog No. 233 shows gear hobbing machines designed for accurate production of large and small quantities of spur, single and double helical and worm gears; spline shafts; ratchets; and sprockets. Specifications and engineering data are supplemented by production examples.

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7	27	47	67	87
8	28	48	68	88
9	29	49	69	89
10	30	50	70	90
11	31	51	71	91
12	32	52	72	92
13	33	53	73	93
14	34	54	74	94
15	35	55	75	95
16	36	56	76	96
17	37	57	77	97
18	38	58	78	98
19	39	59	79	99
20	40	60	80	100

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Market Summary

STEEL market sentiment is definitely bullish. In the wake of the sharp snapback in steelmaking following the coal strike settlement, consumer specifications have spurted. Stronger demand affects virtually all products. Even slow moving items, such as plates and shapes, are under increased pressure. Demand improvement has attained a point where some market authorities regard it as a trend rather than a temporary adjustment from the coal strike setback. They see it as a movement which may well continue into summer in view of tighter supply conditions and expanding requirements of manufacturing industry in various directions.

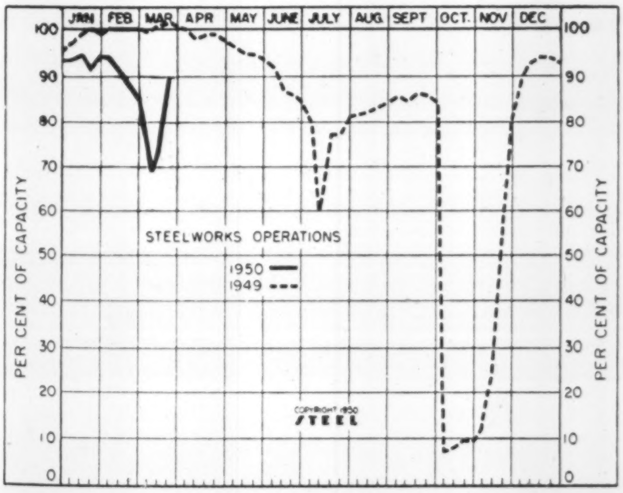
CONSUMPTION—Large volume consumption is in immediate prospect. Demand is expected to tax producing capacity in many products beyond midyear. Contributing to strength is noticeable acceleration in some heavier lines of consumption, such as railroad carbuilding. Automobile production is holding at high level with no sign of letdown. Lost Chrysler output is offset by increased activity of other motor car builders. Anticipated seasonal expansion in building requirements is expected to intensify supply pinches in products in most urgent demand. So long as the building and automotive industries, especially the latter, provide strong demand, high-level operations in steel and general metalworking are assured.

PRODUCTION— Steelmaking operations have snapped back quickly and sharply from the coal-strike curtailments. Full recovery will not be attained for another week, however. Last week the national ingot rate jumped 17 points to 90 per cent of capacity. This followed upon the rise of 4 points the preceding week. Precurtailment operating rate was 94 per cent. Virtually all strike-idled blast furnaces, openhearths and bessemers are expected to be restored to the active list by end of this week.

DISTRICT OPERATIONS— Production gains were reported in virtually all steel producing districts. At Pittsburgh the rate increased 29.5 points to 91 per cent; at Chicago, 3.5 points to 88; eastern Pennsylvania, 11 points to 83; Youngstown, 30 points to 80; Wheeling, 10 points to 100; Buffalo, 5.5 points to 104; Birmingham, 45 points to 87; Cincinnati, 11 points to 96; the West, 5 points to 86 per cent. The rates held unchanged at Detroit, St. Louis and in New England, but declined 4 points to 95 from a revised rate at Cleveland.

PRICES— With production rising rapidly, generally stronger undertone is developing in raw materials, especially coke and scrap. Higher coal prices are expected to push oven coke upward. Beehive furnace and foundry coke are up $1 and 50 cents per ton, respectively. Scrap is currently higher at some points. Demand is sluggish but there is a definitely stronger tone prevailing in this sensitive market. An increase in ferrocolumbium contract prices becomes effective Apr. 1. Chrome ore prices are easier. In finished steel lines, frogs and switches are up 5 per cent, and certain manufacturers of expanded metal have increased their price schedules. Some market observers see in the recent coal settlement and labor demands in the transportation field, another boost in steelmaking costs which, eventually, will be reflected in steel prices. Incidentally, proposed rail freight rate reduction on a selected list of products, averaging about 25 per cent, is facing strong opposition from truckers.

COMPOSITES— Reflecting the stability now prevailing in the market, STEEL's weighted index on finished steel is unchanged at 156.13, as is the arithmetical price composite at $93.18. Pig iron composites are steady with No. 2 foundry, $46.47, basic, $45.97, and malleable, $47.27. The steelmaking scrap composite advanced on strength at Pittsburgh, this index now standing at $28, up 50 cents.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Mar. 18	Change	Same Week 1949	Same Week 1948
Pittsburgh	91	+29.5*	100	95.5
Chicago	88	+ 3.5*	101.5	94.5
Eastern Pa.	83	+11	98	92
Youngstown	80	+30	105	101
Wheeling	100	+10	96.5	92.5
Cleveland	95	— 4*	105.5	94.5
Buffalo	104	+ 5.5	104	107.5
Birmingham	87	+45	100	100
New England	80	0	87	85
Cincinnati	96	+11	103	102
St. Louis	84.5	0	89.5	77.5
Detroit	104	0	106	102
Western	86	+ 5	99	..
Estimated national rate	90	+17	101.5	96

Based on weekly steelmaking capacity of 1,906,267 net tons for 1950; 1,843,516 net tons for 1949; 1,802,476 net tons for 1948.

*Change from revised rate.

Composite Market Averages

	Mar. 16 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	156.13	156.13	156.13	154.85	100.65
Index in cents per lb....	4.230	4.230	4.230	4.195	2.727
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$93.18	$93.18	$93.00	$97.32	$57.55
No. 2 Fdry Pig Iron, GT	46.47	46.47	46.47	46.63	24.67
Basic Pig Iron, GT....	45.97	45.97	45.97	46.22	24.00
Malleable Pig Iron, GT..	47.27	47.27	47.27	47.34	25.29
Steelmaking Scrap, GT..	28.00	27.50	27.52	34.60	19.17

Weighted finished steel index based on average shipments and prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No.1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Mar. 16 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh....	3.45	3.45	3.45	3.35–55	2.15
Bars, H.R., Chicago......	3.45	3.45	3.45	3.35	2.15
Bars, C.F., Pittsburgh	4.10–15	4.10–15	4.10–15	3.95–4.25	2.65
Shapes, Std., Pittsburgh..	3.40	3.40	3.40	3.25–30	2.10
Shapes, Std., Chicago......	3.40	3.40	3.40	3.25	2.10
Plates, Pittsburgh	3.50	3.50	3.50	3.40–60	2.20
Plates, Chicago	3.50	3.50	3.50	3.40	2.20
Plates, Coatesville, Pa. ...	3.60	3.60	3.60	3.75	2.20
Plates, Sparrows Point, Md.	3.50	3.50	3.50	3.45	2.20
Plates, Claymont, Del. ...	3.60	3.60	3.60	3.95	2.20
Sheets, H.R., Pittsburgh..	3.35	3.35	3.35	3.25–30	2.20
Sheets, H.R., Chicago	3.35	3.35	3.35	3.25	2.20
Sheets, C.R., Pittsburgh...	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Chicago......	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Detroit	4.30	4.30	4.30	4.20	3.15
Sheets, Galv., Pittsburgh..	4.40	4.40	4.40	4.40	3.65
Strip, H.R., Pittsburgh....	3.25	3.25	3.25	3.25–70	2.10
Strip, H. R., Chicago	3.25	3.25	3.25	3.25–30	2.10
Strip, C.R., Pittsburgh....	4.15	4.15	4.15	4.00–75	2.80
Strip, C.R., Chicago	4.30	4.30	4.30	4.00–25	2.90
Strip, C.R., Detroit	4.35–40	4.35–40	4.35–40	4.20–50	2.90
Wire, Basic, Pittsburgh...	4.50	4.50	4.50	4.15–50	2.60
Nails, Wire, Pittsburgh...	5.30	5.30	5.30	5.15–6.30	2.80
Tin plate, box, Pittsburgh.	$7.50	$7.50	$7.50	$7.75	$5.00

SEMIFINISHED

	Mar. 16 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Billets, forging, Pitts.(NT)	$63.00	$63.00	$63.00	$61.00	$40.00
Sheet bar, mill (NT)	57.00–58.00	57.00–58.00	57.00–58.00	67.00	34.00
Wire rods, $\frac{7}{32}$-$\frac{5}{8}$", Pitts...	3.85	3.85	3.85	3.40–4.15	2.00

PIG IRON, Gross Ton

	Mar. 16 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$47.00	$47.00	$47.00	$47.00	$25.50
Basic, Valley	46.00	46.00	46.00	46.00	24.50
Basic, del. Phila.	49.44	49.44	49.44	50.30	26.34
No. 2 Fdry, Pitts.	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, Chicago....	46.50	46.50	46.50	46.00–50	25.00
No. 2 Fdry, Valley	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, del. Phila. ...	49.94	49.94	49.94	50.80	26.84
No. 2 Fdry, Birm.	42.38	42.38	42.38	43.38	21.38
No. 2 Fdry.(Birm.)Del Cin.	49.08	49.08	49.08	49.43	25.06
Malleable, Valley	46.50	46.50	46.50	46.50	25.00
Malleable, Chicago	46.50	46.50	46.50	46.50	25.00
Charcoal, Lyles, Tenn. ...	60.00	60.00	60.00	66.00	33.00
Ferromanganese, Etna, Pa.	175.00	175.00	175.00	163.00	140.33*

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* Delivered, Pittsburgh.

SCRAP, Gross Ton

	Mar. 16 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
No. 1 Heavy Melt. Pitts...	$32.00	$31.00	$32.00	$37.00	$20.00
No. 1 Heavy Melt. E. Pa..	24.00	23.50	23.50	35.50	18.75
No. 1 Heavy Melt. Chicago	28.00	28.00	27.50	34.00	18.75
No. 1 Heavy Melt. Valley..	31.75	31.75	31.25	37.25	20.00
No. 1 Heavy Melt. Cleve. .	28.25	28.25	28.25	35.25	19.50
No. 1 Heavy Melt. Buffalo	28.25	28.25	28.25	35.75	19.25
Rails, Rerolling, Chicago..	45.50	44.50	40.50	45.75	22.25
No. 1 Cast, Chicago......	41.00	41.00	40.50	41.50	20.00

COKE, Net Ton

	Mar. 16 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Beehive, Furn., Connlsvl...	$14.25	$13.25	$13.25	$14.50	$7.00
Beehive, Fdry., Connlsvl...	16.00	15.50	15.50	17.00	7.75
Oven Fdry., Chicago......	21.00	21.00	21.00	20.40	13.35

NONFERROUS METALS

	Mar. 16 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Copper, del. Conn.	18.50	18.50	18.50	23.50	12.00
Zinc, E. St. Louis........	10.00	9.75	9.75	17.50	8.25
Lead, St. Louis..........	10.30	10.80	11.80	19.30–35	6.35
Tin, New York	77.25	74.625	74.50	103.00	52.00
Aluminum, del.	17.00	17.00	17.00	17.00	15.00
Antimony, Laredo, Tex. ..	24.50	24.50	27.25	38.50	14.50
Nickel, refinery, duty paid.	40.00	40.00	40.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.
Minimum delivered prices do not include 3% federal tax.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$48.00	$48.50	$49.00	$49.50
Newark,del	50.63	51.13	51.63	52.13
Brooklyn,N.Y.,del.	....	52.79	53.29	....
Birmingham District				
Birmingham R2	41.88	42.38	....	....
Birmingham S9	41.88	42.38	....	....
Woodward,Ala W15	41.88	42.38	....	....
Cincinnati,del	....	49.08	....	....
Buffalo District				
Buffalo H1, R2	46.00	46.50	47.00	....
Tonawanda,N.Y., W12	46.00	46.50	47.00	....
N.Tonawanda,N.Y., T9	....	46.50	47.00	....
Boston,del	55.26	55.76	56.20	....
Rochester,N.Y.,del.	48.63	49.13	49.63	....
Syracuse,N.Y.,del.	49.58	50.08	50.58	....
Chicago District				
Chicago I-3	46.00	46.50	46.50	47.00
Gary,Ind. C3	46.00	....	46.50	....
IndianaHarbor,Ind. I-2	46.00	....	46.50	....
So.Chicago,Ill. W14 Y1	46.00	46.50	46.50	....
So.Chicago,Ill C3	46.00	....	46.50	47.00
Milwaukee,del.	47.89	48.39	48.39	48.89
Muskegon,Mich.,del.	....	51.98	51.98	....
Cleveland District				
Cleveland A7	46.00	46.50	46.50	47.00
Cleveland R2	46.00	46.50	46.50	....
Akron,del. from Cleve.	48.39	48.89	48.89	49.39
Lorain,O. N3	46.00	....	....	47.00
Duluth I-3	....	....	46.50	....
Erie,Pa. I-3	46.00	46.50	46.50	47.00
Everett,Mass. E1	....	50.50	51.00	....
Fontana,Calif. K1	52.00	52.50	....	....
Geneva,Utah G1	46.00	46.50	....	....
Seattle,Tacoma,Wash.,del.	....	54.20	....	....
Portland,Oreg.,del.	....	54.20	....	....
LosAngeles,SanFrancisco,del	53.70	54.20	....	....
GraniteCity,Ill. M10	47.90	48.40	48.90	....
St.Louis,del (incl. tax)	48.65	49.15	49.65	....
Ironton,Utah C11	46.00	46.50	....	....
Minnequa,Colo. C10	47.00	47.50	47.50	....
Pittsburgh District				
NevilleIsland,Pa. P6	46.00	46.50	46.50	47.00
Pitts,N.&S. sides, Ambridge, Aliquippa,del.	47.19	47.69	47.69	48.19
McKeesRock,del.	46.95	47.45	47.45	47.95
Lawrenceville,Homestead, McKeesport,Monaca,del.	47.44	47.94	47.94	48.44
Verona,del	47.90	48.40	48.40	48.90
Brackenridge,del.	48.13	48.63	48.63	49.13
Bessemer,Pa. C3	46.00	....	46.50	47.00
Clairton,Rankin,So.Duquesne,Pa. C3	46.00	....	....	....
McKeesport,Pa. N3	46.00	....	....	47.00
Sharpsville,Pa. S6	46.00	46.50	46.50	47.00
Steelton,Pa. B2	48.00	48.50	49.00	49.50
Steubenville,O. W10	46.00	....	....	....
Struthers,O. S16	46.00	....	....	....
Swedeland,Pa. A3	48.00	48.50	49.00	49.50
Philadelphia,del.	49.44	49.94	50.44	50.94
Toledo,O. I-3	46.00	46.50	46.50	47.00
Cincinnati,del.	51.01	51.51	....	....
Troy,N.Y., R2	48.00	48.50	49.00	49.50
Youngstown District				
Hubbard,O. Y1	46.00	46.50	46.50	....
Youngstown C3	46.00	....	....	47.00
Youngstown Y1	46.00	46.50	46.50	47.00
Mansfield,O.del.	50.26	50.76	50.76	51.26

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si to 11.50%)

Jackson,O. G2, J1	$57.00
Buffalo H1	58.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for 0.045% max. P)

NiagaraFalls,N.Y. P15	$71.50
Keokuk,Iowa, Openhearth & Fdry, frt. allowed K2	77.00
Keokuk,Iowa, OH & Fdry., 12½ lb. piglets, frt, allowed K2.	82.00
Wenatchee,Wash., OH & Fdry, frt. allowed K2	77.00

CHARCOAL PIG IRON, Gross Ton

(Low phos. semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

LylesTenn. T3	$60.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$51.00
Steelton,Pa. B2	54.00
Philadelphia delivered	57.00
Troy,N.Y. R2	54.00

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Semifinished and Finished Steel Products

Mill prices as reported to STEEL, Mar. 16, 1950; cents p r pound unless otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)

Detroit R7	$50.00
Munhall,Pa. C3	50.00

INGOTS, Alloy (NT)

Detroit R7	$51.00
Houston,Tex. S5	59.00
Midland,Pa. C18	51.00
Munhall,Pa. C3	51.00
SoDuquesne,Pa. C3	51.00

BILLETS, BLOOMS & Slabs
Carbon, Rerolling (NT)

Bessemer,Pa. C3	$53.00
Clairton,Pa. C3	53.00
Conshohocken,Pa. A3	58.00
Ensley,Ala. T2	53.00
Fairfield,Ala. T2	53.00
Fontana,Cal. K1	72.00
Gary,Ind. C3	53.00
Johnstown,Pa. B2	53.00
Lackawanna,N.Y. B2	53.00
Munhall,Pa. C3	53.00
Sharon,Pa. S3	57.00
SoChicago,Ill. C3	53.00
So.Duquesne,Pa. C3	53.00

Carbon, Forging (NT)

Bessemer,Pa. C3	$63.00
Buffalo R2	63.00
Canton,O. R2	63.00
Clairton,Pa. C3	63.00
Cleveland R2	63.00
Conshohocken,Pa. A3	65.00
Detroit R7	63.00
Ensley,Ala. T2	63.00
Fairfield,Ala. T2	63.00
Fontana,Calif. K1	85.00
Gary,Ind. C3	63.00
Geneva,Utah G1	63.00
Houston,Tex. S5	71.00
Ind.Harbor,Ind. I-2	63.00
Johnstown,Pa. B2	63.00
Lackawanna,N.Y. B2	63.00
LosAngeles B3	82.00
Munhall,Pa. C3	63.00
Seattle B3	82.00
So.Chicago C3,R2,W14	63.00
So.Duquesne,Pa. C3	63.00
So.SanFrancisco B3	82.00
Warren,O. C17	63.00

Alloy (NT)

Bethlehem,Pa. B2	$66.00
Buffalo R2	66.00
Canton,O. R2, T7	66.00
Conshohocken,Pa. A3	68.00
Detroit R7	66.00
Fontana,Calif. K1	85.00
Gary,Ind. C3	66.00
Houston,Tex. S5	74.00
Ind.Harbor,Ind. Y1	66.00
Johnstown,Pa. B2	66.00
Lackawanna,N.Y. B2	66.00
LosAngeles B3	86.00
Massillon,O. R2	66.00
Midland,Pa. C18	66.00
Munhall,Pa. C3	66.00
Sharon,Pa. S3	66.00
So.Chicago C3,R2,W14	66.00
So.Duquesne,Pa. C3	66.00
Warren,O. C17	66.00
Youngstown Y1	66.00

SHEET BARS (NT)

Mansfield,O. E6	$58.00
Sharon,Pa. S3	57.00

ROUNDS, SEAMLESS TUBE (NT)

Canton,O. R2	$76.00
Cleveland R2	76.00
Ind.Harbor,Ind. I-2	76.00
Massillon,O. R2	76.00
So.Chicago,Ill. R2	76.00

SKELP

Aliquippa,Pa. J5	3.25
Munhall,Pa. C3	3.15
Warren,O. R2	3.15
Youngstown C3, R2	3.15

WIRE RODS

AlabamaCity,Ala. R2	3.85
Buffalo W12	3.85
Cleveland A7	3.85
Donora,Pa. A7	3.85
Fairfield,Ala. T2	3.85
Houston,Tex. S5	4.25
Ind.Harbor,Ind. Y1	3.85
Johnstown,Pa. B2	3.85
Joliet,Ill. A7	3.85
LosAngeles B3	4.65
Minnequa,Colo. C10	4.10
Monessen,Pa. P7	3.85
No.Tonawanda,N.Y. B11	4.10
Pittsburg,Calif. C11	4.50
Portsmouth,O. P12	3.85
Roebling,N.J. R5	3.95
So.Chicago,Ill. R2	3.85
SparrowsPoint B2	3.95
Sterling,Ill.(1) N15	3.85
Struthers,O. Y1	3.85
Torrance,Calif. C11	4.65

STRUCTURALS
Carbon Steel Stand. Shapes

Aliquippa,Pa. J5	3.40
Bessemer,Ala. T2	3.40
Bethlehem,Pa. B2	3.45
Clairton,Pa. C3	3.40
Fairfield,Ala. T2	3.40
Fontana,Calif. K1	4.00
Gary,Ind. C3	3.40
Geneva,Utah G1	3.40
Houston,Tex. S5	3.80
Ind.Harbor,Ind. I-2	3.40
Johnstown,Pa. B2	3.45
KansasCity,Mo. S5	4.00
Lackawanna,N.Y. B2	3.45
LosAngeles B3	4.00
Minnequa,Colo. C10	3.75
Munhall,Pa. C3	3.40
Niles,Calif.(22) P1	4.02
Phoenixville,Pa. P4	3.30
Portland,Oreg. O4	3.90
Seattle B3	4.05
So.Chicago,Ill. C3, W14	3.40
So.SanFrancisco B3	3.95
Torrance,Calif. C11	4.00
Weirton,W.Va. W6	3.40

Alloy Stand. Shapes

Clairton,Pa. C3	4.05
Fontana,Calif. K1	5.25
Munhall,Pa. C3	4.05
So.Chicago,Ill. C3	4.05

H.-S. Low-Alloy
Stand. Shapes

Aliquippa,Pa. J5	5.15
Bessemer,Ala. T2	5.15
Bethlehem,Pa.(14) B2	5.20
Clairton,Pa. C3	5.15
Fairfield,Ala. T2	5.15
Fontana,Calif. K1	5.75
Gary,Ind. C3	5.15
Ind.Harbor,Ind. I-2, Y1	5.15
Johnstown,Pa. B2	5.20
Lackawanna,N.Y.(14)B2	5.20
Munhall,Pa. C3	5.15
So.Chicago,Ill. C3	5.15
Struthers,O. Y1	5.15

Wide Flange

Bethlehem,Pa. B2	3.45
Lackawanna,N.Y. B2	3.45
Munhall,Pa. C3	3.40
So.Chicago,Ill. C3	3.40

H-S., L-A. Wide Flange

Munhall,Pa. C3	5.10
So.Chicago,Ill. C3	5.10

SHEET STEEL PILING

Ind.Harbor,Ind. I-2	4.20
Lackawanna,N.Y. B2	4.20
Munhall,Pa. C3	4.20
So.Chicago,Ill. C3	4.20
Weirton,W.Va. W6	4.20

PLATES, Carbon Steel

AlabamaCity,Ala. R2	3.50
Aliquippa,Pa. J5	3.50
Ashland,Ky.(15) A10	3.50
Bessemer,Ala. T2	3.50
Clairton,Pa. C3	3.50
Claymont,Del. W16	3.60
Cleveland J5, R2	3.50
Coatesville,Pa. L7	3.60
Conshohocken,Pa. A3	3.60
Ecorse,Mich. G5	3.75
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.10
Gary,Ind. C3	3.50
Geneva,Utah G1	3.50
Harrisburg,Pa. C5	3.50
Houston,Tex. S5	3.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa. B2	3.50
Lackawanna,N.Y. B2	3.50
Minnequa, Colo. C10	4.30
Munhall,Pa. C3	3.50
Pittsburgh J5	3.50
Seattle B3	4.40
Sharon,Pa. S3	3.50
So.Chicago,Ill. C3, W14	3.50
SparrowsPoint,Md. B2	3.50
Steubenville,O. W10	3.50
Warren,O. R2	3.50
Weirton,W.Va. W6	3.50
Youngstown C3, R2, Y1	3.50

PLATES (Universal Mill)

Fontana,Calif. K1	4.40

PLATES, Carbon, A.R.

Fontana,Calif. K1	5.25

PLATES, Open-Hearth Alloy

Coatesville,Pa. L7	4.50
Conshohocken,Pa. A3	4.40
Fontana,Calif. K1	5.40
Gary,Ind. C3	4.40
Johnstown,Pa. B2	4.40
Munhall,Pa. C3	4.40
Sharon,Pa. S3	4.40
So.Chicago,Ill. C3	4.40
SparrowsPoint,Md. B2	4.40

PLATES, Wrought Iron

Economy,Pa. B14	7.85

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5	5.35
Bessemer,Ala. T2	5.35
Clairton,Pa. C3	5.35
Cleveland J5, R2	5.35
Conshohocken,Pa. A3	5.35
Ecorse,Mich. G5	5.60
Fairfield,Ala. T2	5.35
Fontana,Calif. K1	5.95
Gary,Ind. C3	5.35
Geneva,Utah G1	5.35
Houston,Tex. S5	5.60
Ind.Harbor,Ind. I-2, Y1	5.35
Johnstown,Pa. B2	5.35
Munhall,Pa. C3	5.35
Pittsburgh J5	5.35
Sharon,Pa. S3	5.35
So.Chicago,Ill. C3	5.35
SparrowsPoint,Md. B2	5.35
Warren,O. R2	5.35
Youngstown Y1	5.35

FLOOR PLATES

Cleveland J5	4.55
Conshohocken,Pa. A3	4.55
Harrisburg,Pa. C5	4.55
Ind.Harbor,Ind. I-2	4.55
Munhall,Pa. C3	4.55
So.Chicago,Ill. C3	4.55

PLATES, Ingot Iron

Asland,c.l.(15) A10	3.75
Ashland,lcl(15) A10	4.25
Cleveland,cl R2	4.10
Warren,O.,cl R2	4.10

BARS, Hot-Rolled Carbon

AlabamaCity,Ala. R2	3.45
Aliquippa,Pa. J5	3.45
Alton,Ill.(1) L1	3.45
Ashland,Ky.(17) A10	3.45
Atlanta,Ga. A11	3.60
Bessemer,Ala. T2	3.45
Buffalo R2	3.45
Canton,O. R2	3.45
Clairton,Pa. C3	3.45
Cleveland R2	3.45
Ecorse,Mich. G5	3.65
Emeryville,Calif. J7	4.20
Fairfield,Ala. T2	3.45
Fontana,Calif. K1	4.10
Gary,Ind. G3	3.45
Houston,Tex. S5	3.85
Ind.Harbor,Ind. I-2, Y1	3.45
Johnstown,Pa. B2	3.45
KansasCity,Mo. S5	4.05
Lackawanna,N.Y. B2	3.45
LosAngeles B3	4.15
Marion,O. P11	3.35
Midland,Pa. C18	3.45
Milton,Pa. B6	3.45
Minnequa,Colo. C10	3.85
Niles,Calif. P1	4.17
N.Tonawanda,N.Y.B11	3.45
Pittsburg,Calif. C11	4.15
Pittsburgh J5	3.45
Portland,Oreg. O4	4.20
Seattle B3, N14	4.20
SoChicago C3, R2, W14	3.45
So.Duquesne,Pa. C3	3.45
S.SanFran.,Cal. B3	4.20
Struthers,O. Y1	3.45
Torrance,Calif. C11	4.15
Weirton,W.Va. W6	3.45
Youngstown C3, R2	3.45

BAR SIZE ANGLES; S. SHAPES

Aliquippa,Pa. J5	3.45
Atlanta A11	3.60
Johnstown,Pa. B2	3.45
Lackawanna,N.Y. B2	3.45
Niles,Calif. P1	4.17
Pittsburgh(23) J5	3.45
Portland,Oreg. O4	4.20
SanFrancisco S7	4.00
Weirton,W.Va. W6	3.45

BAR SIZE ANGLES; H.R.CARBON

Bethlehem,Pa. B2	3.65

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2	3.95
Buffalo R2	3.95
Canton,O. R2, T7	3.95
Clairton,Pa. C3	3.95
Ecorse,Mich. G5	4.25
Fontana,Calif. K1	4.95
Gary,Ind. C3	3.95
Houston,Tex. S5	4.35
Ind.Harbor,Ind. I-2, Y1	3.95
Johnstown,Pa. B2	3.95
KansasCity,Mo. S5	4.55
Lackawanna,N.Y. B2	3.95
LosAngeles B3	5.00
Massillon,O. R2	3.95
Midland,Pa. C18	3.95
So.Chicago C3, R2, W14	3.95
So.Duquesne,Pa. C3	3.95
Struthers,O. Y1	3.95
Warren,O. C17	3.95
Youngstown C3	3.95

BARS, Hot-Rolled Ingot Iron

Ashland,Ky.(17) A10	3.70

BARS & SMALL SHAPES, H.R.,
High-Strength Low-Alloy

Aliquippa,Pa. J5	5.20
Bessemer,Ala. T2	5.20
Bethlehem,Pa. B2	5.20
Clairton,Pa. C3	5.20
Cleveland R2	5.20
Ecorse,Mich. G5	5.40
Fairfield,Ala. T2	5.20
Fontana,Calif. K1	6.25
Gary,Ind. C3	5.20
Ind.Harbor,Ind. I-2, Y1	5.20
Johnstown,Pa. B2	5.20
Lackawanna,N.Y. B2	5.20
Pittsburgh J5	5.20
So.Duquesne,Pa. C3	5.20
Struthers,O. Y1	5.20
Youngstown C3	5.20

BARS, Cold-Finished Carbon

Aliquippa,Pa. K5	4.15
Ambridge,Pa. W18	4.15
BeaverFalls,Pa. M12,R2	4.15
Buffalo B5	4.15
Camden,N.J. P13	4.63
Carnegie,Pa. C12	4.15
Chicago W18	4.15
Cleveland A7, C20	4.15
Detroit P17	4.30
Donora,Pa. A7	4.15
Ecorse,Mich. G5	4.35
Elyria,O. W8	4.15
FranklinPark,Ill. N5	4.15
Gary,Ind. R2	4.15
Hammond,Ind. L2, M13	4.15
Hartford,Conn. R2	4.55
Harvey,Ill. B5	4.15
LosAngeles R2	5.55
Mansfield,Mass. B5	4.55
Massillon,O. R2, R8	4.15
Midland,Pa. C18	4.15
Monaca,Pa. S17	4.15
Newark,N.J. W18	4.55
Plymouth,Mich. P5	4.40
Pittsburgh J5	4.10
Putnam,Conn. W18	4.55
Readville,Mass. C14	4.55
St.Louis,Mo. M5	4.55
So.Chicago,Ill. W14	4.15
SpringCity,Pa.(5) K3	4.55
Struthers,O. Y1	4.15
Waukegan,Ill. A7	4.15
Youngstown F3, Y1	4.15

BARS, Cold-Finished Alloy

Aliquippa,Pa. K5	4.90
Ambridge,Pa. W18	4.90
BeaverFalls,Pa. M12	4.90
Bethlehem,Pa. B2	4.90
Buffalo B5	4.90
Canton,O. R2, T7	4.90
Carnegie,Pa. C12	4.90
Chicago W18	4.90
Cleveland A7, C20	4.90
Detroit P17	5.05
Donora,Pa. A7	4.90
Elyria,O. W8	4.90
Gary,Ind. R2	4.90
Hammond,Ind. L2, M13	4.90
Hartford,Conn. R2	5.20
Harvey,Ill. B5	4.90
Lackawanna,N.Y. B2	4.90
Mansfield,Mass. B5	5.20
Massillon,O. R2, R8	4.90
Midland,Pa. C18	4.90
Monaca,Pa. S17	4.90
Newark,N.J. W18	5.20
Plymouth,Mich. P5	5.10
So.Chicago,Ill. R2, W14	4.90
Struthers,O. Y1	4.90
Waukegan,Ill. A7	4.90
Warren,O. C17	4.90
Worcester,Mass. A7	5.20
Youngstown F3, Y1	4.90

RAIL STEEL BARS

ChicagoHts.,Ill.(3) I-2	3.30
ChicagoHts.,Ill.(4) I-2	3.45
FortWorth,Tex.(26) T4	4.33
Huntngtn,W.Va.(3) W7	3.45
Moline,Ill.(3) R2	3.40
SouthAvis,Pa.(2) J8	3.30
SouthAvis,Pa.(41) J8	3.30
SouthAvis,Pa.(42) J8	3.30
Williamsport(2,3) S19	3.45

BARS, Wrought Iron

Economy,Pa.(S.R.) B14	9.50
Economy,Pa.(D.R.)B14	11.00
Economy(Staybolt) B14	11.30
McK.Rks.(S.R.) L5	8.60
McK.Rks.(D.R.) L5	11.25
McK.Rks.(Staybolt) L5	12.75

BARS, Reinforcing
(Fabricated; to Consumers)

Huntington,W.Va. W7	4.50
Johnstown, ¼-1" B2	4.35
LosAngeles B3	5.00
Marion,O. P11	4.25
Seattle B3, N14	5.10
SouthAvis,Pa. J8	4.35
So.SanFrancisco B3	5.00
SparrowsPt., ¼-1" B2	4.35
Williamsport,Pa. S19	4.35

BARS, Reinforcing (Fabricators)

AlabamaCity,Ala. R2	3.45
Alton,Ill.(6) L1	3.45
Atlanta,Ga. A11	3.60
Buffalo R2	3.45
Cleveland R2	3.45
Emeryville,Calif. J7	4.20
Fairfield,Ala. T2	3.45
Fontana,Calif. K1	4.10
Gary,Ind. C3	3.45
Houston,Tex. S5	3.85
Ind.Harbor,Ind. I-2, Y1	3.45
Johnstown,Pa. B2	3.45
KansasCity,Mo. S5	4.05
Lackawanna,N.Y. B2	3.45
LosAngeles B3	4.15
Milton,Pa. B6	3.45
Minnequa,Colo. C10	4.25
Niles,Calif. P1	4.17
Pittsburg,Calif. C11	4.15
Pittsburgh J5	3.45
Portland,Oreg. O4	4.20
SandSprings,Okla. S5	4.35
Seattle,Wash. B3, N14	4.20
SouthAvis,Pa. J8	3.45
So.Chicago,Ill. R2	3.45
So.Duquesne,Pa. C3	3.45
So.SanFrancisco B3	4.20
SparrowsPoint,Md. B2	3.45
Struthers,O. Y1	3.45
Torrance,Calif. C11	4.15
Youngstown C3, R2	3.45

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. C3	4.20
Fontana,Calif. K1	4.95
Gary,Ind. C3	4.20
Youngstown C3	4.20

SHEETS, Hot-Rolled Steel
(18 gage and heavier)

AlabamaCity,Ala. R2	3.35
Ashland,Ky.(8) A10	3.35
Butler,Pa. A10	3.35
Cleveland J5, R2	3.35
Conshohocken,Pa. A3	3.45
Ecorse,Mich.(8) G5	3.55
Fairfield,Ala. T2	3.35
Fontana,Calif. K1	4.25
Gary,Ind. C3	3.35
Ind.Harbor,Ind. I-2, Y1	3.35
Irvin,Pa. C3	3.35
Lackawanna,N.Y. B2	3.35
Munhall,Pa. C3	3.35
Niles,O. N12	3.50
Niles,O. M4	3.75
Pittsburg,Calif. C11	4.05
Pittsburgh J5	3.35
Sharon,Pa. S3	3.35
So.Chicago,Ill. W14	3.35
SparrowsPoint,Md. B2	3.35
Steubenville,O. W10	3.35
Torrance,Calif. C11	4.05
Warren,O. R2	3.35
Weirton,W.Va. W6	3.35
Youngstown C3, Y1	3.35

SHEETS, Hot-Rolled Carbon
Steel (19 gage and lighter)

AlabamaCity,Ala. R2	4.50
Dover,O. R1	4.65
Ind.Harbor,Ind. I-2	4.40
Mansfield,O. E6	4.15
Niles,O. N12	4.10
Niles,O. M4	4.65
Torrance,Calif. C11	5.15

SHEETS, H-R (14 ga., heavier)
High-Strength Low-Alloy

Cleveland J5, R2	5.05
Conshohocken,Pa. A3	5.05
Ecorse,Mich. G5	5.25
Fairfield,Ala. T2	5.05
Fontana,Calif. K1	6.74
Gary,Ind. C3	5.05
Ind.Harbor,Ind. I-2, Y1	5.05
Irvin,Pa. C3	5.05
Lackawanna(35) B2	5.05
Pittsburgh J5	5.05
Sharon,Pa. S3	5.05
So.Chicago,Ill. C3	5.05
SparrowsPoint(36) B2	5.05
Warren,O. R2	5.05
Weirton,W.Va. W6	5.05
Youngstown, C3, Y1	5.05

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2	6.20
Ecorse,Mich. G5	6.40
Fontana,Calif. K1	7.05
Gary,Ind. C3	6.20
Ind.Harbor,Ind. I-2, Y1	6.20
Irvin,Pa. C3	6.20
Lackawanna(37) B2	6.20
Pittsburgh J5	6.20
Sharon,Pa. S3	6.20
SparrowsPoint(38) B2	6.20
Warren,O. R2	6.20
Weirton,W.Va. W6	6.20
Youngstown Y1	6.20

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.10
Cleveland J5, R2	4.10
Ecorse,Mich. G5	4.30
Fairfield,Ala. T2	4.10
Follansbee,W.Va. F4	4.10
Fontana,Calif. K1	5.00
Gary,Ind. C3	4.10
GraniteCity,Ill. G4	4.30
Ind.Harbor,Ind. I-2, Y1	4.10
Irvin,Pa. C3	4.10
Lackawanna,N.Y. B2	4.10
Middletown,O. A10	4.10
Pittsburg,Calif. C11	5.05
Pittsburgh J5	4.10
SparrowsPoint,Md. B2	4.10
Steubenville,O. W10	4.10
Warren,O. R2	4.10
Weirton,W.Va. W6	4.10
Youngstown Y1	4.10

SHEETS, Gal'zd No. 10 Steel

AlabamaCity,Ala. R2	4.40
Ashland,Ky.(8) A10	4.40
Canton,O. R2	4.40
Delphos,O. N16	5.15
Dover,O. R1	4.75
Fairfield,Ala. T2	4.40
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Kokomo,Ind. C16	4.50
MartinsFerry,O. W10	4.40
Niles,O. N12	4.65
Pittsburg,Calif. C11	5.15
SparrowsPoint,Md. B2	4.40
Steubenville,O. W10	4.40
Torrance,Calif. C11	5.15
Weirton,W.Va. W6	4.40

SHEETS, Galvanized No. 10, High-Strength Low Alloy

Irvin,Pa. C3	6.75
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	4.95
Irvin,Pa. C3	4.95
Kokomo,Ind. C16	5.05
Niles,O. N12	5.20

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	4.65
Middletown,O. A10	4.65

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.25
Niles,O. R2 (28)	5.25
Weirton,W.Va. W6	5.10

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.05

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va. W10	4.80
Gary,Ind. C3	4.80
Mansfield,O. E6	4.80
Middletown,O. A10	4.80
Niles,O. N12	4.80
Weirton,W.Va. W6	4.80

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.20

ROOFING SHORT TERNES (Package; 8 lb coated)

Gary,Ind. C3	$17.50
Yorkville, O. W10	17.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$6.60
Gary,Ind. C3	6.50
Ind.Harbor I-2	6.50
Irvin,Pa. C3	6.50
Yorkville,O. W10	6.50

SHEETS, Lt. Coated Ternes, 6 lb

Yorkville,O. W10	$7.20

SHEETS, Mfg. Ternes, 8 lb

Gary,Ind. C3	$8.10
Warren,O. R2	8.10
Yorkville,O. W-10	8.10

SHEETS, Coated Ternes, 12 lb

Yorkville,O. W10	8.95

SHEETS, Culvert. No. 16

	Cu Alloy	Cu Fe
Ashland A10	5.20	...
Canton,O. R2	5.25	5.70
Fairfield,Ala. T2	5.20	5.45
Gary C3	5.20	5.45
IndianaHarbor I-2	5.20	5.45
Irvin,Pa. C3	5.20	5.45
Kokomo C16	5.40	...
MartinsFy,O. W10	5.20	5.45
Pittsburg,Cal. C11	5.95	...
SparrowsPt. B2	5.20	...
Torrance,Cal. C11	5.95	...

SHEETS, Culvert, No. 16 Corrugated Ingot Iron

Ashland,Ky. A10	5.45

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.60
Cleveland R2	3.95
Ind.Harbor,Ind. I-2	3.60
Warren,O. R2	3.95

SHEETS, Cold-Rolled Ingot Iron

Cleveland R-2	4.70
Middletown,O. A10	4.60
Warren,O. R2	4.70

SHEETS, Galvanized Ingot Iron No. 10 Flat

Ashland,Ky.(8) A10	4.65
Canton,O. R2	5.15
Ind.Harbor,Ind. I-2	4.80

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	4.90
Middletown,O. A10	4.90

SHEETS, Well Casing

Torrance,Calif. C11	4.85

SHEETS, Drum Body

Pittsburg,Calif. C11	4.05
Torrance,Calif. C11	4.05

SHEETS, Aluminized

Butler,Pa. A10	7.75

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$6.35	$6.60	$6.85
Fairfield,Ala. T2	6.45	6.70	6.95
Gary,Ind. C3	6.35	6.60	6.85
GraniteCity,Ill. G4	6.55	6.80	7.05
Ind.Harbor,Ind. I-2, Y1	6.35	6.60	6.85
Irvin,Pa. C3	6.35	6.60	6.85
Niles,O. R2	6.35	6.60	6.85
Pittsburg,Calif. C11	7.10	7.35	7.60
SparrowsPoint,Md. B2	6.45	6.70	6.95
Weirton,W.Va. W6	6.35	6.60	6.85
Yorkville,O. W10	6.35	6.60	6.85

SHEETS, SILICON, H.R. or C.R. (22 Ga.) Coils (Cut Lengths ½c lower)

	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut lengths)	...	...	6.70	7.95	8.75
Brackenridge,Pa. A4	...	...	7.20	8.45	9.25
Follansbee F4 (cut lengths)	...	...	*6.70*	*7.95*	*8.75*
GraniteCity,Ill. G4(cut lengths)	...	...	6.90	8.15	...
Ind.Harbor,Ind. I-2	6.40	6.70	(34)	...	...
Mansfield,O. E6 (cut lengths)	5.90	6.20	6.70	7.95	8.75
Niles,O. N12 (cut lengths)	...	6.20	6.70	...	...
Niles,O. M4 (24 Gage)	5.65	5.95	6.45	...	...
Vandergrift,Pa. C3	...	6.70	7.20	8.45	9.25
Warren,O. R2	6.40	6.70	7.20	8.45	9.25
Zanesville,O. A10	...	6.70	7.20	8.45	9.25

SHEETS, SILICON (22 Gage Base) Coils (Cut Lengths ½c lower)

Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.30	9.85	10.55	11.35
Brackenridge,Pa. A4	9.80	10.35	11.05	....
Follansbee F4 (cut length)	9.30	9.85	10.55	11.35
Vandergrift,Pa. C3	9.80	10.35	11.05	11.85
Warren,O. R2	9.80	....	....	....
Zanesville,O. A10	9.80	10.35	11.05	11.85

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)

	T-100	T-90	T-80	T-73
Vandergrift,Pa. C3	*12.35*	*13.20*	*14.20*	*14.70*

TIN PLATE, American COKE (Base Box)

	1.25 lb	1.50 lb
Aliquippa J5	$7.30	$7.50
Fairfield,Ala. T2	7.40	7.60
Gary C3	7.30	7.50
Gran.City,Ill. G4	7.50	7.70
Ind.Harbor I-1, Y1	7.30	7.50
Irvin,Pa. C3	7.30	7.50
Pitts.Cal. C11	8.05	8.25
Sp.Pt.,Md. B2	7.40	7.60
Warren R2	7.30	7.50
Weirton W6	7.30	7.50
Yorkville,O. W10	7.30	7.50

CANMAKING BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$5.60
Fairfield,Ala. T2	5.70
Gary,Ind. C3	5.60
GraniteCity,Ill. G4	5.80
Ind.Harbor,Ind. I-2, Y1	5.60
Irvin,Pa. C3	5.60
Niles,O. R2	5.60
Pittsburg,Calif. C11	6.35
SparrowsPoint,Md. B2	5.70
Warren,O. R2	5.60
Weirton,W. Va. W6	5.60
Yorkville,O. W10	5.60

HOLLOWARE ENAMELING Black Plate (29 gage)

Aliquippa,Pa. J5	5.30
Follansbee,W.Va. F4	5.30
Gary,Ind. C3	5.30
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. C3	5.30
Niles,O. R2	5.30
SparrowsPoint,Md. B2	5.40
Warren,O. R2	5.30
Yorkville,O. W10	5.30

SHEETS, Enam'lg. Iron

Ashland,Ky.(8) A10	4.40
Cleveland R2	4.40
Ecorse,Mich. G5	4.70
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Middletown,O. A10	4.40
Niles,O. M4	4.90
Youngstown Y1	4.40

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2	4.95
Conshohocken,Pa. A3	4.95
Ecorse,Mich. G5	5.15
Fairfield,Ala. T2	4.95
Fontana,Cal. K1	6.64
Gary,Ind. C3	4.95
Ind.Harb.,Ind. I-2, Y1	4.95
Lackawanna,N.Y. B2	4.95
Sharon,Pa. S3	4.95
SparrowsPoint, Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown C3, Y1	4.95

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.10
Carnegie,Pa. S18	5.10
Fontana,Calif. K1	6.30
Gary,Ind. C3	5.10
Houston,Tex. S5	5.50
KansasCity,Mo. S5	5.70
NewBritn,Conn.(10) S15	5.10
Sharon,Pa. S3	5.10
Youngstown C3	5.10

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.50
Warren,O. R2	3.85

STRIP, Hot-Rolled Carbon

Alton,Ill.(1) L1	3.25
Ashland,Ky.(8) A10	3.25
Atlanta A11	3.40
Bessemer,Ala. T2	3.25
Bridgeprt,Conn.(10) S15	3.25
Butler,Pa. A10	3.25
Carnegie,Pa. S18	3.25
Conshohocken,Pa. A3	3.35
Detroit M1	3.45
Ecorse,Mich. G5	3.45
Fairfield,Ala. T2	3.25
Fontana,Calif. K1	4.40
Gary,Ind. C3	3.25
Houston,Tex. S5	3.65
Ind.Harbor,Ind. I-2, Y1	3.25
KansasCity,Mo.(9) S5	3.85
Lackawanna,N.Y. B2	3.25
LosAngeles B3	4.00
Milton,Pa. B6	3.25
Minnequa,Colo. C10	4.30
NewBritain(10) S15	3.25
N.Tonawanda,N.Y. B11	3.25
Pittsburg,Calif. C11	4.00
Riverdale,Ill. A1	3.25
SanFrancisco S7	3.90
Seattle B3, N14	4.25
Sharon,Pa. S3	3.25
So.Chicago,Ill. W14	3.25
So.SanFrancisco B3	4.00
SparrowsPoint,Md. B2	3.25
Torrance,Calif. C11	4.00
Warren,O. R2	3.25
Weirton,W.Va. W6	3.25
WestLeechburg,Pa. A4	3.25
Youngstown C3, Y1	3.25

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15	9.50
Carnegie,Pa. S18	9.50
Cleveland A7	9.50
Dover,O. G6	9.50
Harrison,N.J. C18	9.80
NewBritn,Conn.(10) S15	9.50
Pawtucket,R.I.(11) N8	9.50
Pawtucket,R.I.(12) N8	9.80
Sharon,Pa. S3	9.50
Worcester,Mass. A7	9.80
Youngstown C8	9.50

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	4.75

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	4.15
Berea,O. C7	5.60
Bridgprt,Conn.(10) S15	4.15
Butler,Pa. A10	4.15
Cleveland A7, J5	4.15
Dearborn,Mich. D3	4.40
Detroit, D2	4.40
Detroit M1	4.35
Dover,O.(40) G6	4.15
Ecorse,Mich. G5	4.35
Follansbee,W.Va. F4	4.15
Fontana,Calif. K1	5.40
FranklinPark,Ill. T6	4.30
Ind.Harbor,Ind. I-2	4.30
Lackawanna,N.Y. B2	4.15
LosAngeles C1	5.50
Mattapan,Mass.(21) T6	4.65
Middletown,O. A10	4.15
NewBritain(10) S15	4.15
NewCastle,Pa. B4, E5	4.15
NewHaven,Conn. A7, D2	4.65
NewYork W3	5.00
Pawtucket,R.I.(11) N8	4.70
Pawtucket,R.I.(21) N8	4.65
Riverdale,Ill. A1	4.30
Rome,N.Y. R6	4.15
Sharon,Pa.(30) S3	4.15
SparrowsPoint,Md. B2	4.15
Trenton,N.J. (13) R5	4.65
Wallingford,Conn. W2	4.65
Warren,O.(25) T5	4.15
Warren,O. R2	4.15
Weirton,W.Va. W6	4.15
Youngstown C8, Y1	4.15

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland A7, J5	6.20
Dover,O. G6	6.20
Ecorse,Mich. G5	6.40
Fontana,Calif. K1	6.95
Lackawanna,N.Y., B2	6.40
Sharon,Pa. S3	6.20
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.20
Weirton,W. Va. W6	6.20
Youngstown Y1	6.20

STRIP, Electro Galvanized

Weirton,W.Va. W6	4.15
Youngstown C8	4.15

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.25-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Bridgeport,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
Bristol,Conn. W1	...	...	6.40	8.35	....
Carnegie,Pa. S18	...	5.95	6.55	8.50	10.80
Cleveland A7	4.15	5.95	6.55	8.50	10.80
Dover,O. G6	4.15	5.95	6.55	8.50	10.80
FranklinPark,Ill. T6	4.40	6.10	6.70	8.65	....
Harrison,N.J. C18	...	...	6.85	8.80	11.10
Mattapan,Mass. T6	4.65	6.25	6.85	8.80	11.10
NewBritn.,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
NewCastle,Pa. B4	4.15	5.95	6.55	8.50	....
NewCastle,Pa. E5	4.15	5.95	6.55	8.50	10.80
NewYork W3	...	6.30	6.90	8.85	11.15
Pawtucket,R. I. N8:					
Cleve.orPitts.Base (29)	4.55	5.50	6.10	8.05	10.35
Worcester,Base (29)	4.50	5.80	6.40	8.35	10.65
Sharon,Pa. S3	4.15	5.95	6.55	8.50	10.80
Trenton,N.J. R5	...	6.25	6.85	8.80	11.10
Wallingford,Conn. W2	4.65	6.25	6.85	8.80	11.10
Weirton,W.Va. W6	4.15	5.95	6.55	8.50	10.80
Worcester,Mass. A7	4.45	6.25	6.85	8.80	11.10
Worcester,Mass. T6	4.65	6.25	6.85	8.80	11.10
Youngstown C8	4.50	5.95	6.55	8.50	10.80
Spring Steel (Tempered)					
Trenton,N.J. R5	...	...	9.30	11.25	13.85

Key to Producing Companies

A1	Acme Steel Co.
A3	Alan Wood Steel Co.
A4	Allegheny Ludlum Steel
A7	American Steel&Wire
A8	Anchor Drawn Steel Co.
A9	Angell Nail & Chaplet
A10	Armco Steel Corp.
A11	Atlantic Steel Co.
A13	American Cladmetals Co.
B1	Babcock & Wilcox Tube
B2	Bethlehem Steel Co.
B3	Beth.Pac. Coast Steel
B4	Blair Strip Steel Co.
B5	Bliss & Laughlin Inc.
B6	Boiardi Steel Corp.
B8	Braeburn Alloy Steel
B11	Buffalo Bolt Co.
B14	A. M. Byers Co.
C1	Calif. Cold Rolled Steel
C3	Carnegie-Illinois Steel
C4	Carpenter Steel Co.
C5	Central Iron & Steel Div. Barium Steel Corp.
C7	Clev. Cld.Roll.Mills Co.
C8	Cold Metal Products Co.
C9	Colonial Steel Co.
C10	Colorado Fuel & Iron
C11	Columbia Steel Co.
C12	Columbia Steel & Shaft.
C13	Columbia Tool Steel Co.
C14	Compressed Steel Shaft
C16	Continental Steel Corp.
C17	Copperweld Steel Co.
C18	Crucible Steel Co.
C19	Cumberland Steel Co.
C20	Cuyahoga Steel & Wire
D2	Detroit Steel Corp.
D3	Detroit Tube & Steel
D4	Disston & Son, Henry
D6	Driver-Harris Co.
D7	Dickson Weatherproof Nail Co.
E1	Eastern Gas&Fuel Assoc.
E2	Eastern Stainless Steel
E4	Electro Metallurgical Co.
E5	Elliott Bros. Steel Co.
E6	Empire Steel Corp.
F2	Firth Sterling Steel
F3	Fitzsimons Steel Co.
F4	Follansbee Steel Corp.
F6	Fretz-Moon Tube Co.
G1	Geneva Steel Co.
G2	Globe Iron Co.
G3	Globe Steel Tubes Co.
G4	Granite City Steel Co.
G5	Great Lakes Steel Corp
G6	Greer Steel Co.
H1	Hanna Furnace Corp.
H4	Heppenstall Co.
I-1	Igoe Bros. Inc.
I-2	Inland Steel Co.
I-3	Interlake Iron Corp.
I-4	Ingersoll Steel Div., Borg-Warner Corp.
J1	Jackson Iron & Steel Co
J3	Jessop Steel Co.
J4	Johnson Steel & Wire Co.
J5	Jones & Laughlin Steel
J6	Joslyn Mfg. & Supply
J7	Judson Steel Corp.
J8	Jersey Shore Steel Co.
K1	Kaiser Steel Corp.
K2	Keokuk Electro-Metals
K3	Keystone Drawn Steel
K4	Keystone Steel & Wire
K5	Kidd Drawn Steel Co.
L1	Laclede Steel Co.
L2	LaSalle Steel Co.
L3	Latrobe Electric Steel
L5	Lockhart Iron & Steel
L6	Lone Star Steel Co.
L7	Lukens Steel Co.

TIGHT COOPERAGE HOOP

Atlanta A11	3.60
Riverdale,Ill. A1	3.60
Sharon,Pa. S3	3.60
Youngstown C3	3.60

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	5.90
Alton,Ill.(1) L1	5.90
Bartonville,Ill.(1) K4	5.90
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth A7	5.90
Fostoria,O. S1	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Milbury,Mass(12) N6	6.20
Monessen,Pa. P7	5.90
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
SparrowsPoint,Md. B2	6.00
Struthers,O. Y1	5.90
Trenton,N.J., A7	6.20
Waukegan,Ill. A7	5.90
Worcester A7,J4,T6,W12	6.20

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	5.35
Buffalo W12	5.35
Cleveland A7	5.35
Crawfordsville,Ind. M8	5.35
Dover,O. G6	5.35
Fostoria,O. S1	5.50
Kokomo,Ind. C16	5.35
FranklinPark,Ill. T6	5.70
Massillon,O. R8	5.35
Monessen,Pa. P7	5.35
Pawtucket,R.I.(11) N8	5.70
Pawtucket,R.I.(12) N8	5.65
Trenton,N.J. R5	5.65
Worcester A7, T6, W12	5.65

WIRE, Fine and Weaving (8-in. Coils)

Bartonville,Ill.(1) K4	8.45
Buffalo W12	8.45
Chicago W13	8.45
Cleveland A7	8.45
Crawfordsville,Ind. M8	8.45
Fostoria,O. S1	8.45
Johnstown,Pa. B2	*8.45*
Kokomo,Ind. C16	8.45
Palmer,Mass. W12	8.75
Portsmouth,O. P12	8.45
Roebling,N.J. R5	8.75
Waukegan,Ill. A7	8.45
Worcester,Mass. A7, T6	8.75

ROPE WIRE

	Mild Plow	Plow	Imp. Plow
Bartonville,Ill. K4	8.05	8.05	8.30
Buffalo W12	8.05	8.05	8.30
Cleveland A7	8.05	8.05	8.30
Donora,Pa. A7	8.05	8.05	8.30
Fostoria,O. S1	8.05	8.05	8.30
Johnstown,Pa. B2	*8.05*	*8.05*	*8.30*
Monessen,Pa. P7	8.05	8.05	8.30
NewHaven,Conn. A7	8.35	8.35	8.60
Palmer,Mass. W12	8.05	8.05	8.30
Portsmouth,O. P12	8.05	8.05	8.30
Roebling,N.J. R5	8.35	8.35	8.60
SparrowsPoint,Md. B2	*8.15*	*8.15*	*8.40*
Struthers,O. Y1	8.05	8.05	8.30
Trenton,N.J. A7	8.35	8.35	8.60
Waukegan,Ill. A7	8.05	8.05	8.30
Williamsport,Pa. B2	*8.15*	*8.15*	*8.40*
Worcester,Mass. J4, T6	8.35	8.35	8.60

WIRE, Manufacturers Bright, Low-Carbon

AlabamaCity,Ala. R2	4.50
Aliquippa,Pa. J5	4.50
Atlanta A11	4.60
Alton,Ill.(1) L1	4.50
Bartonville,Ill.(1) K4	4.50
Buffalo W12	4.50
Chicago W13	4.50
Cleveland A7, C20	4.50
Crawfordsville,Ind. M8	4.60
Donora,Pa. A7	4.50
Duluth A7	4.50
Fairfield,Ala. T2	4.50
Fostoria,O.(24) S1	4.85
Houston S5	4.90
Johnstown,Pa. B2	4.50
Joliet,Ill. A7	4.50
KansasCity,Mo. S5	5.10
Kokomo,Ind. C16	4.60
LosAngeles B3	5.45
Minnequa,Colo. C10	4.75
Monessen,Pa. P7	4.50
Newark,6-8ga. I-1	5.15
No.Tonawanda B11	4.90
Palmer,Mass. W12	4.80
Pittsburg,Calif. C11	5.45
Portsmouth,O. P12	4.50
Rankin,Pa. A7	4.50
So.Chicago,Ill. R2	4.50
So.SanFrancisco C10	5.45
SparrowsPoint,Md. B2	4.60
Sterling,Ill.(1) N15	4.50
Struthers,O. Y1	4.50
Torrance,Calif. C11	5.45
Waukegan,Ill. A7	4.50
Worcester,Mass. A7, T6	4.80

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.55
Alton,Ill.(1) L1	5.55
Buffalo W12	5.55
Cleveland A7	5.55
Donora,Pa. A7	5.55
Duluth A7	5.55
Johnstown,Pa. B2	5.55
LosAngeles B3	6.50
Monessen P7	5.55
NewHaven,Conn. A7	5.85
Palmer,Mass. W12	5.85
Pittsburg,Calif. C11	6.50
Portsmouth,O. P12	5.55
Roebling,N.J. R5	5.85
So.Chicago,Ill. R2	5.55
SparrowsPoint,Md. B2	5.65
Struthers,O. Y1	5.55
Torrance,Calif. C11	6.50
Trenton,N.J. A7	5.85
Waukegan,Ill. A7	5.55
Worcester,Mass. A7	5.85

WIRE, Merchant Quality

(6 to 8 gage	An'ld	Galv.
AlabamaCity R2	5.35	5.60
Aliquippa J5	5.35	5.60
Atlanta A11	5.45	5.70
Bartonville(19) K4	5.35	5.60
Buffalo(31) W12	4.50	...
Cleveland A7	5.35	5.60
Crawfordsvil. M8	5.45	5.70
Donora A7	5.35	5.60
Duluth A7	5.35	5.60
Fairfield T2	5.35	5.60
Houston,Tex. S5	5.75	6.00
Johnstown B2	5.35	5.60
Joliet,Ill. A7	5.35	5.60
KansasCy,Mo. S5	5.95	6.20
Kokomo C16	5.45	5.70
LosAngeles B3	6.30	...
Minnequa C10	5.60	5.85
Monessen P7	5.35	5.60
Palmer(31) W12	4.80	...
Pitts.,Cal. C11	6.30	6.55
Prtsmth.(18) P12	5.35	5.60
Rankin A7	5.35	5.60
So.Chicago R2	5.35	5.60
So.S.Fran. C10	6.30	6.55
SparrowsPt. B2	5.45	5.70
Sterling,Ill.(1)N15	5.35	5.60
Struthers,O. Y1	5.35	5.60
Torrance,Cal. C11	6.30	...
Worcester A7	5.65	5.90

WIRE (16 gage)

	An'ld. Stone	Galv. Stone
Aliquippa J5	9.80	11.30
Bartonville(1) K4	9.80	11.30
Cleveland A7	9.80	11.30
Crawfrdsvil. M8	9.80	11.30
Fostoria,O. S1	9.90	11.40
Johnstown B2	9.80	11.30
Kokomo C16	9.80	11.30
Minnequa C10	9.40	10.90
Palmer,Mass. W12	9.35	10.85
Pitts.,Cal. C11	10.15	11.65
Prtsmth.(18) P12	9.80	11.30
SparrowsPt. B2	9.90	11.40
Waukegan A7	9.80	11.30

WIRE, Galv'd ACSR for Cores

Roebling,N.J. R5	8.45
SparrowsPoint,Md. B2	*8.25*

WIRE, Tire Bead

Roebling,N.J. R5	10.80

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	126
Aliquippa,Pa. J5	126
Atlanta A11	128
Crawfordsville M8	128
Donora,Pa. A7	126
Duluth,Minn. A7	126
Fairfield,Ala. T2	126
Houston,Tex. S5	134
Johnstown,Pa. B2	126
Joliet,Ill. A7	126
KansasCity,Mo. S5	138
Kokomo,Ind. C16	128
Minnequa,Colo. C10	131
Monessen,Pa. P7	126
Pittsburg,Calif. C11	146
Portsmouth,O.(18) P12	126
Rankin,Pa. A7	126
So.Chicago,Ill. R2	126
So.SanFran.,Calif. C10	146
SparrowsPoint,Md. B2	128
Sterling,Ill.(1) N15	126

FENCE POSTS

	Col.
Duluth A7	116
Huntington,W.Va. W7	116
Johnstown,Pa. B2	*116*
Joliet,Ill. A7	116
Minnequa,Colo. C10	121
Moline,Ill. R2	112
So.Chicago R2	116
Williamsport,Pa. S19	120

WOVEN FENCE, 9-15½Ga.

	Col.
AlabamaCity,Ala. R2	116
Ala.City,Ala.,17-18ga.R2	198
Aliquippa,,Pa.9-14½ga.J5	116
Atlanta A11	118
Bartonville,Ill.(19) K4	116
Crawfordsville,Ind. M8	118
Donora,Pa. A7	116
Duluth A7	116
Houston,Tex. S5	124
Fairfield,Ala. T2	116
Johnstown,Pa. B2	116
Johnstn,17ga.6" B2	190
Johnstn,17ga.,4" B2	193
Joliet,Ill. A7	116
KansasCity,Mo. S5	128
Kokomo,Ind. C16	118
Minnequa,Colo. C10	121
Monessen,Pa. P7	116
Pittsburg,Calif. C11	139
Portsmouth,O.(18) P12	116
Rankin,Pa. A7	116
So.Chicago,Ill. R2	116

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	113
Atlanta A11	114
Bartonville,Ill.(19) K4	113
Chicago W13	113
Crawfordsville M8	115
Donora,Pa. A7	113
Duluth A7	113
Fairfield,Ala. T2	113
Joliet,Ill. A7	113
KansasCity,Mo. S5	125
Kokomo,Ind. C16	115
Minnequa,Colo. C10	118
Pittsburg,Calif. C11	137
Portsmouth,O.(18) P12	113
So.Chicago,Ill. R2	113
So.SanFran.,Calif. C10	137
SparrowsPoint,Md. B2	115
Sterling,Ill.(1) N15	113

NAILS & STAPLES, Stock To Dealers & Mfrs. (7)

	Col.
AlabamaCity,Ala. R2	106
Aliquippa,Pa. J5	106
Atlanta A11	108
Bartonville,Ill.(19) K4	106
Chicago,Ill. W13	106
Cleveland A9	112
Crawfordsville,Ind. M8	108
Donora,Pa. A7	106
Duluth A7	106
Fairfield,Ala. T2	106
Galveston,Tex. D7	114
Houston,Tex. S5	114
Johnstown,Pa. B2	106
Joliet,Ill. A7	106
KansasCity,Mo. S5	118
Kokomo,Ind. C16	108
Minnequa,Colo. C10	111
Monessen,Pa. P7	106
Pittsburg,Calif. C11	125
Portsmouth,O. P12	106
Rankin,Pa. A7	106
So.Chicago,Ill. R2	106
SparrowsPoint,Md. B2	108
Sterling,Ill.(1) N15	106
Torrance,Calif. C11	126
Worcester,Mass. A7	112

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	5.35
Bartonville,Ill.(19) K4	5.35
Crawfordsville,Ind. M8	5.45
Donora,Pa. A7	5.35
Duluth A7	5.35
Johnstown,Pa. B2	5.35
Joliet,Ill. A7	5.35
Kokomo,Ind. C16	5.45
Minnequa,Colo. C10	5.60
Pittsburg,Calif. C11	6.30
Portsmouth,O. P12	5.35
Rankin,Pa. A7	5.35
So.Chicago,Ill. R2	5.35
SparrowsPoint,Md. B2	5.45
Worcester,Mass. A7	5.65

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa. A3	$6.75
Wheeling,W.Va. W10	6.75

AXLES

Fairfield,Ala. T2	5.25
Gary,Ind. C3	5.25
Ind.Harbor,Ind. S13	5.25
Johnstown,Pa. B2	5.25
McKeesRocks,Pa. C3	5.25

TIE PLATES

Fairfield,Ala. T2	4.20
Gary,Ind. C3	4.20
Ind.Harbor,Ind. I-2	4.20
Lackawanna,N.Y. B2	4.20
Minnequa,Colo. C10	4.20
Pittsburg,Calif. C11	4.35
Pittsburgh R2	4.20
Seattle B3	4.35
Steelton,Pa. B2	4.20
Torrance,Calif. C11	4.35
Weirton,W.Va. W6	4.20

JOINT BARS

Bessemer,Pa. C3	4.40
Fairfield,Ala. T2	4.40
Ind.Harbor,Ind. I-2	4.40
Joliet,Ill. C3	4.40
Lackawanna,N.Y. B2	4.40
Minnequa,Colo. C10	4.40
Steelton,Pa. B2	4.40

TRACK BOLTS

	(20) Treated
Fairfield,Ala. T2	9.10
KansasCity,Mo. S5	9.10
Lebanon,Pa.(32) B2	8.85
Minnequa,Colo. C10	8.85
Pittsburgh O3, P14	9.10
Seattle B3	9.35

STANDARD TRACK SPIKES

Fairfield,Ala. T2	5.60
Ind.Harbor,Ind. I-2, Y1	5.60
KansasCity,Mo. S5	5.85
Lebanon,Pa. B2	5.60
Minnequa,Colo. C10	5.60
Pittsburgh J5	5.60
Seattle B3	6.10
So.Chicago,Ill. R2	5.60
Struthers,O. Y1	5.60
Youngstown R2	5.60

RAILS

	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb Under
Bessemer,Pa. C3	3.40	3.30	3.35	3.75
Ensley,Ala. T2	3.40	3.30	...	3.75
Fairfield,Ala. T2	...	...	...	3.75
Gary,Ind. C3	3.40	3.30	3.35	...
Huntington,W.Va. W7	...	...	...	3.75
Ind.Harbor,Ind. I-2	3.40	3.30	3.35	...
Johnstown,Pa. B2	...	...	...	(16)3.75
Lackawanna B2	3.40	3.30	...	3.75
Minnequa,Colo. C10	3.40	3.30	...	4.25
Steelton,Pa. B2	3.40	3.30	...	...

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	21.00	18W,4Cr,3V	126.00
Extra Carbon	24.50	18W,4Cr,2V,9Co	185.50
Spec. Carbon	29.50	18W,4Cr,2V,6Co	169.50
Oil Hardening	32.00	18.25W,4.25Cr,1V,4.75Co	156.50
Cr Hot Wrk.	32.00	20.25W,4.25Cr,1.6V,12.25Co	293.50
Hi-Carbon-Cr	57.50	1.5W,4Cr,1V,8.5Mo	71.50
18W,4Cr,1V	100.00	6.4W,4.5Cr,1.9V,5Mo,	76.50
18W,4Cr,2V	113.00	6W,4Cr,3V,6Mo	97.00

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M9, M14, R2, S8, T7, U4, V2, V3.

(1) Chicago Base.
(2) Angles.
(3) Merchant.
(4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. Base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh Base.
(11) Cleveland & Pittsburgh Base.
(12) Worcester, Mass. Base.
(13) 3"& wider; over ½" to under 3" 5.15c.
(14) Also wide flange beams.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh Base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. Base.
(22) Del. San Fran. Bay area.
(23) Angles 1"x1" to 1¼"x1¼" only.
(24) Deduct 0.35c for finer than 15 Ga.
(25) Up to 0.035 C; 4.40c, 0.035 C and over.
(26) Reinforcing, mill shipments; to consumers, 4.83c; fabricated to fabricators, 4.58c.
(28) Bonderized.
(29) 0.26-0.40 C.
(30) 0.40 C and less.
(31) Not annealed.
(32) Untreated.
(33) To jobbers, deduct 20 cents.
(34) 6.70c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 Ga. & lighter; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 4.40c, 0.035" and heavier.
(41) Flats.
(42) Bands.

Key to Producing Companies

M1	McLouth Steel Corp.
M4	Mahoning Valley Steel
M5	Medart Co.
M6	Mercer Tube & Mfg. Co.
M8	Mid-States Steel & Wire
M9	Midvale Co.
M10	Missouri-Illinois Furnace
M12	Moltrup Steel Products
M13	Monarch Steel Co.
M14	McInnes Steel Co.
N2	National Supply Co.
N3	National Tube Co.
N5	Nelsen Steel & Wire Co.
N6	New EngHighCarb. Wire
N8	Newman-Crosby Steel
N12	Niles Rolling Mill Co.
N14	Nrthwst. Steel Roll.Mills
N15	Northwestern S.&W. Co.
N16	New Delphos Mfg.Co.
O3	liver Iron & Steel Corp.
O4	regon Steel Mills.
P1	acific States Steel Corp.
P2	acific Tube Co.
P4	hoenix Iron & Steel Co.
P5	lgrim Drawn Steel
P6	ittsburgh Coke & Chem.
P7	ittsburgh Steel Co.
P9	ittsburgh Tube Co.
P11	Pollak Steel Co.
P12	Portsmouth Steel Corp.
P13	Precision Drawn Steel
P14	Pitts. Screw & Bolt Co.
P15	Pittsburgh Metallurgical
P16	Page Steel & Wire Div., Amer. Chain & Cable
P17	Plymouth Steel Co.
R1	Reeves Steel & Mfg. Co.
R2	Republic Steel Corp.
R3	Rhode Island Steel Corp.
R5	Roebling's Sons, John A.
R6	Rome Strip Steel Co.
R7	Rotary Electric Steel Co.
R8	Reliance Div.,EatonMfg.
S1	Seneca Wire & Mfg. Co.
S3	Sharon Steel Corp.
S5	Sheffield Steel Corp.
S6	Shenango Furnace Co.
S7	Simmons Co.
S8	Simonds Saw & Steel Co.
S9	Sloss-Sheffield S.&I. Co.
S13	Standard Forgings Corp.
S14	Standard Tube Co.
S15	Stanley Works
S16	Struthers Iron & Steel
S17	Superior Drawn Steel Co.
S18	Superior Steel Corp.
S19	Sweet's Steel Co.
T2	Tenn. Coal, Iron & R.R.
T3	Tenn. Prod. & Chem.
T4	Texas Steel Co.
T5	Thomas Steel Co.
T6	Thompson Wire Co.
T7	Timken Roller Bearing
T9	Tonawanda Iron Div. Am. Rad. & Stan. San.
U4	Universal Cyclops Steel
V2	Vanadium Alloys Steel
V3	Vulcan Crucible Steel Co.
W1	Wallace Barnes Co.
W2	Wallingford Steel Co.
W3	Washburn Wire Co.
W4	Washington Steel Corp.
W6	Weirton Steel Co.
W7	W. Va. Steel & Mfg. Co.
W8	Wstrn.Auto.Mach.Screw
W9	Wheatland Tube Co.
W10	Wheeling Steel Corp.
W12	Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13	Wilson Steel & Wire Co.
W14	Wisconsin Steel Div., International Harvester
W15	Woodward Iron Co.
W16	Worth Steel Co.
W18	Wyckoff Steel Co.
Y1	Youngstwn Sheet & Tube

STANDARD PIPE, T. & C.

BUTTWELD — Carload Discounts from List, %

Size Inches	List Per Ft	Pounds Per Ft	Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	36.5	34.5	35.5	8.5	9	7.5
¼	6.0	0.42	33.5	31.5	32.5	9.5	11	8.5
⅜	6.0	0.57	29	27	28	5.5	8	4.5
½	8.5	0.85	40.5	38.5	39.5	24.0	22.0	23.0
¾	11.5	1.13	43.5	41.5	42.5	28.0	26.0	27.0
1	17.0	1.68	46.0	44.0	45.0	31.0	29.0	30.0
1¼	23.0	2.28	46.5	44.5	45.5	31.5	29.5	30.5
1½	27.5	2.73	47.0	45.0	46.0	32.0	30	31.0
2	37.0	3.68	47.5	45.5	46.5	32.5	30.5	31.5
2½	58.5	5.82	48.0	46.0	47.0	33.0	31.0	32.0
3	76.5	7.62	48.0	46.0	47.0	33.0	31.0	32.0

Column A: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 1½ percentage points lower on ⅛", 2 points lower on ¼", 3 points lower on ⅜", W10. Wheatland, Pa., 2 pts lower on ⅛" through ⅜",W9. Following make ½" and larger: Lorain, O. N3; Youngstown, plus 42% on 3½" and 4", R2; Youngstown Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 31% on 3½" and 4".

Columns B & E: Sparrows Point Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y-1; Alton, Ill. (Lorain, O., base) L1 quotes 2 points lower on ⅛", ¼", ⅜".

Column D: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa., ⅛" through ⅜", F6; Benwood, W. Va., except 3½ points lower on ⅛", 2½ pts on ¼", 3 pts on ⅜" W10. Wheatland, Pa., except 2 pts lower on ⅛" through ⅜", W9. Following make ½" and larger: Lorain N3; Youngstown, plus 26.5% on 3½" and 4", R2; Youngstown, Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 15.5% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD — Carload Discounts from List, %

Size Inches	List Per Ft	Pounds Per Ft	Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	36.0	20.5	36.0	20.5
2½	58.5	5.82	39.0	23.5	39.0	23.5
3	76.5	7.62	39.0	23.5	39.0	23.5
3½	92.0	9.20	41.0	25.5	41.0	25.5
4	$1.09	10.89	41.0	25.5	41.0	25.5
5	1.48	14.81	41.0	25.5	41.0	25.5
6	1.92	19.18	41.0	25.5	41.0	25.5

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5; Lorain, O. N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft. inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	12.36	14.39	13.96	13.96
1¼	13	14.63	17.05	14.19	16.54
1½	13	16.17	19.02	15.68	18.45
1¾	13	18.39	21.64	17.84	20.99
2	13	20.61	24.24	19.99	23.51
2¼	13	22.96	27.03	22.27	26.22
2¼	12	25.29	29.76	24.53	28.87
2½	12	27.71	32.58	26.88	31.60
2¾	12	29.36	34.53	28.48	33.49
3	12	30.82	36.27	29.90	35.18
3¼	11	35.87	42.22	34.79	40.95
3½	11	38.52	45.35	37.36	43.99
4	10	47.82	56.25	46.39	54.56
4½	9	63.37	74.59	61.47	72.35
5	9	73.37	86.32	71.17	83.73
6	7	112.62	132.51	....	....

Boiler tube producers include Babcock & Wilcox Tube Co., National Tube Co., Globe Steel Tubes Co., Pittsburgh Steel Co., Republic Steel Corp., Standard Tube Co.

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates Carbon Base 10%	Plates Carbon Base 20%	Strip Cold-Rolled Carbon Base 10%	Strip Cold-Rolled Carbon Base Both sides	Sheets Carbon Base 10%	Sheets Carbon Base 20%	Sheets Copper Base Both Sides
302	....	....	....	....	19.75	21.50–22.50	75.00
304	22.50	26.50	....	....	20.75	22.50–24.00	77.00
305	....	....	....	....	....	....	79.00
309	27.00	31.00	....	....	....	....	....
310	32.50	36.50	....	....	....	....	105.00
316	27.00	31.00	....	....	26.00	28.00–32.00	....
317	30.50	34.50	....	....	....	....	....
318	29.50	33.50	....	....	....	....	....
321	23.50	27.50	....	....	23.00	25.00	90.00
347	25.00	29.00	....	....	24.00	26.00–30.00	94.00
405	18.75	24.75	....	....	....	....	....
410	18.25	24.25	....	....	....	....	....
430	18.25	24.25	....	....	....	....	....
Nickel	27.50	34.50	31.50	41.00	....	....	88.00
Inconel	36.00	46.00	....	....	....	....	115.00
Monel	29.00	37.00	26.50	33.50	....	....	83.00
Copper*	....	....	19.75†	23.75†	....	....	....

* Dexodized. † Deduct 4.25c for hot-rolled. Production points for carbon base products: Stainless plates and sheets, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16 and Coatesville, Pa. L7; nickel, inconel and monel-clad plates, Coatesville L7; nickel, monel and copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam.	27
⁹⁄₁₆-in. & ⅝-in.	29
¾-in. and larger	26
Longer than 6 in.:	
All diams.	22
Lag bolts, all diams.:	
6 in. and shorter	30
over 6 in. long	28
Ribbed Necked Carriage	26
Blank	40
Plow	40
Step, Elevator, Tap, and Sleigh Shoe	28
Tire bolts	20
Boiler & Fitting-Up Bolts	37

NUTS

	Reg.	Heavy
H.P. & C.P. Reg. & Heavy Square:		
½-in. and smaller	25	
⁹⁄₁₆-in. & ⅝-in.	23	
¾-in.-1½-in.	23	
1⅝ in. and larger	16	
H.P. Hex.:	Reg.	Heavy
½-in. & smaller	33	29
⁹⁄₁₆-in. & ⅝-in.	28	25
¾-in.-1½-in.	25	23
1⅝ in. & larger	17	16
C.P. Hex:		
½-in. & smaller	33	29
⁹⁄₁₆-in. & ⅝-in.	30	27
¾-in. & 1½ in.	27	24
1⅝ in. & larger	20	17

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Hvy.	Reg.	Lght.
½-in. and smaller	35	41	41
⁹⁄₁₆-in. & ⅝-in.	30	36	36
¾-in.-1½ in.	27	31	33
1⅝-in.&larger	17	21	..

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	63.5 & 10
Plated finishes	50 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
¼-in. through ⅝-in.	50
¾-in. through 1 in.	43
Longer than 6 in.:	
¼-in. through ⅝-in.	33
¾-in. through 1 in.	13

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam x 6 in. and shorter	46
1 in. and smaller diam. x over 6 in.	33

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	41
¼-in. diam. & larger	24
N.F. thread, all diams.	18

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger	7.25c
⁷⁄₁₆-in., under	43 off

Washers, Wrought

F.o.b. shipping point, to jobbers ....Net to $1 off

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

Inches Diam.	Inches Length	Cents per lb.
GRAPHITE		
17,18,20	60,72	16.00
8 to 16	48,60,72	16.50
7	48,60	17.75
6	48,60	19.00
4, 5⅛	40	19.50
3	40	20.50
2½	24,30	21.00
2	24.30	23.00
CARBON		
40	100,110	7.50
35	100,110	7.50
30	84,110	7.50
24	72 to 104	7.50
17 to 20	34,90	7.50
14	60,72	8.00
10,12	60	8.25

STAINLESS STEEL

(cents per pound)

Type	Sheets	C.R. Strip	Bars Wire Structurals
301...	37.50	30.50	28.50
302...	37.50	33.00	28.50
303...	39.50	36.50	31.00
304...	39.50	35.00	30.00
309...	52.00	52.00	41.50
316...	53.00	55.00	46.00
321...	45.50	44.50	34.00
347...	50.00	48.50	38.50
410...	33.00	27.00	23.00
416...	33.50	33.50	23.50
420...	40.50	43.50	28.50
430...	35.50	27.50	23.50
501...	24.00	22.50	11.50
502...	25.00	23.50	12.50

Baltimore, Types 301 through 347 sheets, except 309 E2.
Baltimore, bars, wire and structurals A10.
Brackenridge,Pa., sheets A4
Bridgeville, Pa., bars, wire, sheets & strip, except Type 309 strip quoted 51.00c U4.
Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502 A10.
Carnegie, Pa., strip except Type 416; Type 309 strip quoted 51.00c S18.
Cleveland, strip, except Type 309 quoted 51.00c, and except Type 416 A7.
Detroit, strip, except Type 309 M1.
Dunkirk,N.Y., bars, wire A4.
Duquesne, Pa., bars C3.
Gary, Ind., sheets except Type 416 C3.
Harrison, N. J., strip C18.
Massillon, all products, except Type 309 bars, wire & structurals quoted 42.00c, Type 501, 10.50c, Type 502 11.50c R2.
McKeesport, Pa., bars; sheets except Type 416, C3.
McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.
Middletown, O., sheets and strip, except Types 303, 416, 420, 501 and 502 A10.
Midland, sheets & strip C18.
Munhall, Pa., bars C3.
Pittsburgh, sheets C18.
Reading, Pa., bars & strip except Type 309 bars quoted 42.00c C4.
So. Chicago, Ind., bars & structurals C3.
Syracuse, N. Y., bars, wire & structurals C18.
Titusville, Pa., bars U4.
Wallingford, Conn., strip, except 309, W2 quotes ¼-cent higher.
Washington, Pa., bars, sheets & strip except Type 309 strip quoted 51.00c J3.
Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 58.00c, strip 60.00c W4.
Watervliet, N. Y., structurals & bars A4.
Waukegan, bars & wire A7.
West Leechburg, Pa., strip, except Type 309 quoted 51.00c A4.
Youngstown, strip C8.

COAL, CHEMICALS

Spot, cents per gallon, ovens	
Pure benzol	22.00
Toluol, one deg.	19.00-24.75
Industrial xylol.	20.50-26.50
Per ton bulk, ovens	
Sulphate of ammonia	$45.00
Cents per pound, ovens	
Phenol, 40 (carlots, returnable drums)	13.50
Do., less than carlots	14.25
Do., tank cars	12.50

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34. Imported, net ton, duty paid, metallurgical grade, $39-$40.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh)

	Cents
Sponge Iron:	
98+% Fe, carlots	15.00
Swedish, c.i.f. New York, in bags	7.40-8.50
Electrolytic Iron:	
Annealed, 99.5% Fe	39.50
Unannealed, 99+% Fe	33.50
Unannealed, 99+% Fe (minus 325 mesh)	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns	70.00-135.00
Aluminum:	
Carlots, freight allowed	27.00
Atomized, 500-lb drums, freight allowed	30.00
Brass, 10-ton lots	23.25-26.25
Copper:	
Electrolytic	27.75
Reduced	27.00
Lead	18.50
Manganese:	
Minus 100-mesh	52.00-55.00
Minus 35 mesh	48.00
Minus 200 mesh	56.00
Nickel, unannealed	61.00-66.00
Silicon	34.00-40.00
Solder (plus cost of metal)	8.50
Stainless Steel, 302	75.00
Tin	86.50
Zinc, 10-ton lots	15.25-18.00
	Dollars
Tungsten:	
99%, minus 80 to 200 mesh, freight allowed,	
over 1000 lb	2.90
1000 lb	2.95
less than 1000 lb	3.00
98.8%, minus 65 mesh, freight allowed.	
1000 lb and over	2.90
less than 1000 lb	3.00
Molybdenum:	
99%, minus 80 to 200 mesh.	
over 500 lb	2.25
200 to 500 lb	2.60
less than 200 lb	2.75
82-88%, freight allowed,	
2000 lb and over	2.40
less than 2000 lb	2.45
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvll,fur.	*$14.00-14.50*
Connellsvll,fdry.	*15.50-16.50*
New River, foundry	18.00
Wise county, foundry	15.35
Wise county, furnace	14.60

OVEN FOUNDRY COKE

Kearney, N. J., ovens	$22.00
Everett, Mass., ovens	
New England, del.‡	22.70
Chicago, ovens	21.00
Chicago, del.	†22.45
Detroit, del.	24.91
Terre Haute, ovens	21.20
Milwaukee, ovens	21.75
Indianapolis, ovens	*20.75*
Chicago, del.	*24.12*
Cincinnati, del.	*23.67*
Detroit, del.	*24.65*
Ironton, O., ovens	20.40
Cincinnati, del.	22.71
Painesville, O., ovens	21.90
Buffalo, del.	24.02
Cleveland, del.	23.62
Erie, del.	22.04
Birmingham, ovens	18.70
Philadelphia, ovens	20.45
Neville Island, Pa., ovens	20.00
Swedeland, Pa., ovens	20.40
Portsmouth, O., ovens	19.50
Detroit, ovens	21.65
Detroit, del	22.65
Buffalo, del.	*24.00*
Flint, del.	24.09
Pontiac, del.	23.04
Saginaw, del.	24.40

Includes representative switching charge of: *, $1.05; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡ Or within $4.03 freight zone from works.

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R. 15 Ga.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	5.75	6.84	7.20	6.04	...	5.85	6.64	8.60	5.65	5.90	7.34
New York(c'try)	5.55	6.54	6.90	5.84	...	5.65	6.44	8.40	5.45	5.70	7.14
Boston (city) ..	5.75	6.68	7.19	5.98	...	5.80	6.50	8.70	5.75	6.08	7.28
Boston (c'try) .	5.55	6.48	6.99	5.78	...	5.60	6.30	8.50	5.55	5.88	7.08
Phila. (city) ..	6.45	6.60	6.95	5.90	...	5.75	6.46	8.40	5.50	5.70	6.80
Phila. (c'try) .	6.20	6.35	6.70	5.65	...	5.50	6.21	8.15	5.25	5.45	6.55
Balt. (city) ...	5.25	6.69	6.66	5.79	...	5.69	6.39	...	5.69	5.40	7.04
Balt. (c'try) ..	5.05	6.49	6.46	5.59	...	5.49	6.19	...	5.49	5.20	6.84
Norfolk, Va. ..	6.10	...	...	...	...	6.15	7.20	...	6.20	6.15	7.55
Wash. (w'hse).	5.46	...	...	6.00	...	5.90	6.62	...	5.90	5.61	7.25
Buffalo (del.)..	5.25	6.00	7.00	5.61	...	5.25	5.95	10.10††^{5}	5.35	5.65	6.95
Buffalo (w'hse)	5.05	5.80	6.80	5.41	...	5.05	5.75	9.90††^{5}	5.15	5.45	6.75
Pitts. (w'hse)..	5.05	5.80*	6.45-6.70	5.20	6.15	5.00	5.75	9.55††	5.05	5.15	6.40
Detroit (w'hse).	5.33	6.08*	7.09	5.49	...	5.39	6.03	9.86††^{5}	5.44	5.59	6.68
Cleveland (del.)	5.25	6.00	7.15	5.44	6.20	5.32	5.95	8.31	5.37	5.52	6.87
Cleve. (w'hse).	5.05	5.80	6.95	5.24	6.00	5.12	5.75	8.16	5.17	5.32	6.67
Cincin. (w'hse).	5.32	5.84	6.29	5.49	...	5.39	6.10	9.90††^{5}	5.44	5.59	6.75
Chicago (city) .	5.25	6.00*	6.90	5.30	...	5.20	5.85	9.75††^{5}	5.25	5.40	6.60
Chicago (w'hse)	5.05	5.80*	6.70	5.10	...	5.00	5.65	9.55††^{5}	5.05	5.20	6.40
Milwaukee(city)	5.39	6.14*	7.04	5.44	...	5.34	6.09	9.89††^{5}	5.39	5.54	6.74
Milwau. (c'try).	5.19	5.94*	6.84	5.24	...	5.14	5.89	9.69††^{5}	5.19	5.34	6.54
St. Louis (del.).	5.53	6.28	7.18	5.58	...	5.48	6.23	10.03††^{5}	5.53	5.68	6.88
St. L. (w'hse).	5.38	6.13	7.03	5.43	...	5.33	6.08	9.88††^{5}	5.38	5.53	6.73
Birm'ham (del.)	5.20^{10}	5.95	6.30^{3}	5.25^{10}	...	5.15^{10}	6.88	...	5.20^{10}	5.35^{10}	7.63^{10}
Birm'hm(w'hse)	5.05^{10}	5.80	6.15^{3}	5.10^{10}	...	5.00^{10}	...	...	5.05^{10}	5.20^{10}	...
Omaha, Nebr. .	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Los Ang. (city)	5.95	7.15	7.60	6.00	8.25	5.95	7.70	...	5.85	5.95	8.15
L. A. (w'hse).	5.80	7.00	7.45	5.85	8.10	5.80	7.55	...	5.70	5.80	8.00
San Francisco .	6.25^{9}	8.60^{2}	7.50^{2}	6.75^{9}	8.25^{9}	6.15^{9}	7.80^{8}	...	6.00^{9}	6.15^{9}	8.10^{9}
Seattle-Tacoma.	6.70^{7}‡	8.15^{3}	...	6.90	...	6.35	8.50	10.10	6.20	6.35^{7}	8.40^{7}
Kans. (w'hse) .	5.65	6.40	7.30	5.70	...	5.60	6.35	10.10	5.65	5.80	7.00

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 1000 lb and over; ^{1}—1500 lb and over; ^{2}—500 to 1499 lb; ^{3}—450 to 1499 lb; ^{4}—400 to 1499 lb; ^{5}—1000 to 1999 lb; ^{6}—1000 lb and over; ^{7}—300 to 999 lb; ^{8}—300 to 499 lb; ^{9}—400 to 3999 lb; ^{10}—500 to 9999 lb inclusive.

REFRACTORIES

(Prices per 1000 bricks, f.o.b. plant)

FIRE CLAY BRICK

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., $107; Ottawa, Ill., $106. Hard-fired, $141 at above points, except $135, Ottawa, Ill.

High-heat Duty: Salina, Pa. $91; Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $86.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $80.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., $72; Ottawa, Ill., $70.

LADLE BRICK

Dry Press: Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O., Chester, W. Va., New Cumberland, W. Va., $60.

Wire Cut: Chester, W. Va., Wellsville, O., New Cumberland, W. Va., $58.

MALLEABLE BUNG BRICK

St. Louis, Mo., Olive Hill, Ky., $96; Ottawa, Ill., $90; Beach Creek, Pa., $86.

SILICA BRICK

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $86; Hays, Pa., $91; Joliet or Rockdale, Ill., E. Chicago, Ind., $95; Lehi, Utah, Los Angeles, $101.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $84.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $85.

BASIC BRICK

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $66; chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

MAGNESITE

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead - burned, ⅝" grains; bulk, $30.50-$31; single paper bags, $35-$35.50.

DOLOMITE

(Base prices per net ton)

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Narlo, Millersville, Martin, Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45.

ORES

LAKE SUPERIOR IRON ORE

Gross ton, 51½% (natural), lower lake ports. **After Jan. 25, 1950, increases or decreases, if any, in upper lake rail reight, dock handling charges and taxes threon are for buyer's account.**

Old range bessemer	$8.10
Old range nonbessemer	7.95
Mesabi bessemer	7.85
Mesabi nonbessemer	7.70
High phosphorus	7.70

EASTERN LOCAL ORE

Cents per unit, del E. Pa.

Foundry and basic 56.62% concentrates contract	16.00

FOREIGN ORE

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hemitites	15.75
Brazilian iron ore, 68-69%	18.00

TUNGSTEN ORE

Wolframite, scheelite, net ton unit, duty paid	$20-$22

MANGANESE ORE

Long term contracts, nominal; nearby, 48%, duty paid, 79.8c-81.8c per long ton unit, c.i.f. U. S. ports; prices on lower grades adjusted to manganese content and impurities.

CHROME ORE

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore. Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00
South African Transvaal	
44% no ratio	$17.00-18.00
45% no ratio	*17.00-18.00*
48% no ratio	26.00-27.00
50% no ratio	27.00-27.50
Brazilian	
44% 2.5:1 lump	$32.00
Rhodesian	
45% no ratio	$20.00-21.00
48% no ratio	*25.00*
48% 3:1 lump	*35.00-36.00*
Domestic—rail nearest seller	
48% 3:1	$39.00

MOLYBDENUM

Sulphide concentrates per lb, molybdenum content, mines	$0.90

FERROALLOYS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, cl., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload lump bulk, 29c per lb of metal; packed, 35.5c; ton lot 31.25c, less ton lot 33.25c. Delivered. Spot, add 2c.

Manganese, Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 30c; 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

(*Please turn to page* 142)

Nonferrous Prices Active

Lead quotations fall further under pressure from foreign metal, zinc rises as galvanizers resume demand, and open market tin prices climb after RFC revises pricing method

MORE price movements occurred in the nonferrous metals markets in the last two weeks than in any similar period since the middle of last November.

Part of the movements were upward and part downward. They were not reflecting any overall uptrend or downtrend in the nonferrous field. The changes are not the result of movement of one price in sympathy with another; they occurred independently and reflected the true market situation of each metal.

Lead—Increasing supply of foreign lead offered to the U. S. market continues to be a depressing influence on price. Last week the price eased off another half cent a pound, making the price 10.5 cents, New York. This decline came within less than a week after a one-cent reduction. Immediate effect of the weakening of price of primary lead was a cut in prices of lead products, oxides and pigments. Full lead sheets in rolls of 140 square feet and lead pipe in diameters of ⅝ to 6 inches dropped from 17 cents to 16 cents and then to 15.5 cents a pound, and quotations on lead traps and bends and combination lead and iron bends fell from list plus 45 per cent to list plus 40 per cent and then to list plus 37 per cent.

Price declines on primary lead have not sparked any general strengthening of demand. While the high rate of automobile production is a boon to battery makers, users of one-third of the lead consumed in this country, they do not anticipate any step-up in operating schedules before the mid-year upturn in preparation for the 1950-51 winter.

The price weakness in primary lead influenced scrap metal dealers to withdraw from the lead scrap market until stability returns.

Pressure from foreign supplies of lead is attributed to foreign currency devaluation which set off an increase in exports to this country. Imports of refined lead in 1949 totaled 275,241 tons, but since devaluation last fall, imports for October through January have been at a rate of about 322,500 tons annually.

Lead consumption in the U. S. in 1949 decreased about 20 per cent from that of 1948, the U. S. Bureau of Mines estimates. Final figures are expected to show 1949 consumption of around 915,000 tons, compared with 1,133,895 tons in 1948. The three largest outlets for lead—batteries, cable covering and tetraethyl fluid—took 56 per cent of the total quantity of lead consumed. Batteries took 31 per cent, cable covering 14 per cent, and tetraethyl fluid 11 per cent.

Tin—Abandonment by the Reconstruction Finance Corp. last week of its system of fixed price quotations for sale of its tin added buoyance to open market tin prices. The open market price for prompt delivery of Grade A tin had been 74.625 cents a pound immediately prior to RFC's announcement but right after the announcement the quotation had edged up to 74.75 cents, and other increases followed. RFC's fixed price had been 74.5 cents.

RFC will continue to offer Longhorn 3 Star and imported brands of tin accepted in domestic trade as Grade A. Under its new pricing system the price for these brands will be the average for the calendar week following the date of sale of the quotation for prompt Grade A or Straits tin in New York as published in a trade paper. Full preliminary payment based on the quotation for prompt Grade A or Straits tin in New York for the day preceding the sale will be required and subject to later adjustment after determination of final price.

RFC's action followed private sellers' protests against government competition and price setting. Through its action RFC has removed itself as a supplier of tin to private industry, for unless buyers hold pessimistic views about the nearby trend of the market they are not likely to contract on a deferred pricing basis such as adopted by the RFC.

Zinc—Responding to strengthened demand from galvanizers after they were freed from the clutches of the coal miners' strike, zinc rose in price last week from 9.75 cents a pound for prime western grade at East St. Louis to 10 cents. This marked the first zinc price change since Jan. 17. As a result of this advance, the price of zinc dust automatically rose to 13 cents a pound delivered in carload lots. A leading maker of die casting alloy raised its price 0.25 cents to 14 cents delivered.

Not only has steel companies' demand for zinc revived but the zinc requirements of die casters and the brass mills are well sustained.

Because of the good demand and small smelter stocks of zinc the price of this metal was impervious to sympathetic effects of the downtrend of the price of lead.

Domestic zinc smelters produced the largest quantity of slab zinc in the peacetime history of the industry, the U. S. Bureau of Mines reports. Output, up 2 per cent over the 1948 level, totaled 870,000 tons.

Galvanizing continued in 1949 to be the largest field for the use of zinc, although the steel strike cut the quantity of slab consumed to a level below the record 1948. Zinc-base alloys, largely die castings, continued as the second largest user of slab zinc. Consumption of slab zinc for manufacture of brass products dropped sharply in 1949 from the 1948 level as a result of the abnormally large return of brass scrap to the mills, thereby lowering their requirements for primary metals.

Aluminum—Primary aluminum will be produced at capacity at least during the first half of 1950, orders received indicate.

In January, primary aluminum production of 104,045,600 pounds was more than 25 per cent over December's output of 82,322,329 pounds, says the Aluminum Association, New York. Shipments of aluminum sheet, strip and plate moved up from 62,524,984 pounds in December to 69,349,363 pounds in January.

Copper—Demand for copper continues steady and the domestic price for electrolytically refined metal remains firm and unchanged at 18.5 cents a pound, delivered Connecticut Valley. Total bookings of copper for March passed the 97,000-ton mark last week and sales for April shipment were already up to around half that figure. Deliveries of refined copper to fabricators in February totaled 112,773 tons, slightly above January's 111,668 tons. The February deliveries were considerably in excess of domestic production and imports, with a result that stocks at refineries dropped to 77,472 tons, lowest since last April.

New Specifications Set for Nonferrous Scrap

SPECIFICATION standards for nonferrous scrap will be revised Apr. 1 for the first time in five years.

The changes, largely in zinc and lead categories, were overwhelmingly approved by the Metal Dealers Division of the National Association of Waste Material Dealers during the association's annual convention in New York last week.

The approximately 15 new standard classifications result from numerous conferences between smelters, refiners and ingot producers.

During the convention the Metal Dealers Division also elected officers. New president is Leo Selig, J. Solotken & Co., Indianapolis. Vice presidents chosen are E. J. Pulaski, Pulaski Iron & Metal Co., Houston; Hyman Moskowitz, Moskowitz Bros., Cincinnati; Joseph Roth, Roth Bros. Metal Co., Syracuse, N. Y.; and Harry Schwartz, Alaska Junk Co., Seattle.

The Secondary Metal Institute elected Edwin A. Bergman, U. S. Reduction Co., East Chicago, Ind., president, and Hugo Simon, Barth Smelting Corp., Newark, N. J., vice president.

Devaluation cannot be held entirely responsible for increased imports of nonferrous metals into the United States, Simon D. Strauss, vice president, American Smelting & Refining Co., told the Secondary Metal Institute. Devaluation merely added a stimulus to the movement of foreign tonnages to the U. S., he says. Even before devaluation, buying of metals by foreign countries was declining but their production had risen to prewar normal levels. The quantity available for shipment to the U. S. is therefore up substantially.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 18.50c, Conn. Valley, Lake, 18.62½c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 16.75-18.25c; 88-10-2 No. 215) 25.25c; 80-10-10 (No. 305) 21.75c; No. 1 yellow (No. 405) 14.25-16.00c,

Zinc: Prime western 10.00c, brass special 10.25c, intermediate 10.50c, East St. Louis; high grade 11.10c, delivered.

Lead: Common, 10.30c; chemical, 10.40c; corroding, 10.40c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, f.o.b. shipping point.

Secondary Aluminum: Piston alloys 16.00-16.50c; No. 12 foundry alloy (No. 2 grade) 15.50-16.00c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 17.25-17.75c; grade 2, 16.75-17.25c; grade 3, 15.25-15.75c; grade 4, 14.75c-15.00c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt del., 77.25c; March del. 77.25c; April del. 77.25c; May del. 77.12½c; June del. 77.00c. Chinese 99% tin, prompt del., nominal.

Antimony: American 99-99.8% and over but not meeting specifications below 24.50c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 25.00c; f.o.b. Laredo, Tex., for bulk shipments. Foreign, 99%: Chinese, 23.00c; English, Belgian, prompt, 23.00c, New York.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $71-$74 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.

Cobalt: 97-99%, $1.80 per lb for 550 lb (keg); $1.80 per lb for 100 lb (case); $1.87 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 73.25c per oz.

Platinum: $66-$69 per ounce.

Palladium: $24 per troy ounce.

Iridium: $100 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 18.50-cent copper.)

Sheet: Copper 32.18; yellow brass 28.69; commercial bronze, 95%, 32.10; 90%, 31.61; red brass, 85%, 30.60; 80%, 30.12; best quality, 29.58; nickel silver, 18%, 42.27; phosphor-bronze, grade A, 5% 50.90.

Rods: Copper, hot-rolled 28.03; cold-drawn 29.28; yellow brass free cutting, 23.19; commercial bronze, 95% 31.79; 90% 31.30; red brass 85% 30.29; 80% 29.81.

Seamless Tubing: Copper 32.22; yellow brass 31.70; commercial bronze 90% 34.27; red brass 85% 33.51; 80% 33.03.

Wire: Yellow brass 28.98; commercial bronze, 95% 32.39; 90% 31.90; red brass, 85% 30.89; 80% 30.41; best quality brass 29.87.

Copper Wire: Bare soft, f.o.b., eastern mills, 100,000 lb lots 22.55, l.c.l. 23.17, c.l. 22.67; weatherproof, f.o.b. eastern mills, 100,000 lb lots 24.85, l.c.l. 25.60, c.l. 25.10; magnet, delivered, c.l. 28.50, 15,000 lb or more 28.75, l.c.l. 29.25.

ALUMINUM

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-24	36.8	33.4	39.5
0.008-0.0075	12-24	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

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* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	——Hexagonal—— R317-T4	17S-T4
0.125	48.0	...	...
0.156-0.203	41.0	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	...	36.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	32.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $15.50 per cwt; add 50c per cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, $15.50 per cwt. Traps and bends: List price plus 37%.

ZINC

Sheets, 15.50c f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 15.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 14.00c; over 12-in., 15.00c.

NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled, 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

DAILY PRICE RECORD

1949	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Mar 16	18.50	10.30	10.00	77.25	17.00	24.50	40.00	73.25
Mar. 15	18.50	10.30	10.00	76.50	17.00	24.50	40.00	73.25
Mar. 14	18.50	10.30	10.00	75.50	17.00	24.50	40.00	73.25
Mar. 13	18.50	10.80	9.75	74.75	17.00	24.50	40.00	73.25
Mar. 9-11	18.50	10.80	9.75	74.625	17.00	24.50	40.00	73.25
Mar. 6-8	18.50	11.80	9.75	74.625	17.00	24.50	40.00	73.25
Mar. 2-4	18.50	11.80	9.75	74.50	17.00	24.50	40.00	73.25
Mar. 1	18.50	11.80	9.75	74.375	17.00	27.25	40.00	73.25
Feb. Avg.	18.50	11.80	9.75	74.352	17.00	27.318	40.00	73.25
Feb. 23-28	18.50	11.80	9.75	74.125	17.00	27.25	40.00	73.25
Feb. 21	18.50	11.80	9.75	74.25	17.00	27.25	40.00	73.25
Feb. 20	18.50	11.80	9.75	74.37½	17.00	27.25	40.00	73.25
Feb. 14-18	18.50	11.80	9.75	74.50	17.00	27.25	40.00	73.25

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton, 27.00c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 28.84c; oval 28.34c; cast 26.87c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 46.50c f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 25.75c; over 250 lb, 24.75c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 100 lb, 64.00c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbl. 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over 91.00c; 500 to 999 lb, 91.5c; 200 to 499 lb, 92.00c; less than 200 lb, 93.5c; ball, 1000 lb and over, 93.25c; 500 to 999 lb, 93.75c; 200 to 499 lb 94.25c; less than 200 lb, 95.75c f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 58.2c; 100 or 300 lb drums only, 100 to 500 lb, 49.9c; 600 to 1900 lb, 47.6c; 2000 to 9900 lb, 45.8c, f.o.b. Sewaren, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100-lb drums 38.00c, f.o.b. Niagara Falls, N. Y.; 40.50c f.o.b. Cleveland; 39.25c, del., Detroit and Philadelphia.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb 84.50c; more than 2000 lb, 82.50c, f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, 70.80c; 100 lb kegs 71.80c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb, f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	15.50	15.50	14.75
Yellow brass	12.50	12.25	11.37½
Commercial Bronze			
95%	14.50	14.25	13.75
90%	14.25	14.00	13.50
Red brass			
85%	14.00	13.75	13.25
80%	13.62½	13.37½	12.87½
Best Quality (71-80%)	13.37½	13.12½	12.62½
Muntz Metal	11.50	11.25	10.75
Nickel, silver, 10%..	14.50	14.25	7.25
Phos. bronze, A.....	16.75	16.50	15.50
Naval brass	12.00	11.75	11.25
Manganese bronze ..	12.00	11.75	11.12½

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, delivered eastern refineries, carload lots)

No. 1 copper 15.25; No. 2 copper 14.25; light copper 13.25; composition red brass 12.50; radiators 10.00; heavy yellow brass 9.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 15.25; No. 2 copper 14.25; light copper 13.25; refinery brass (60% copper) per dry copper content 13.50-13.75.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and brass: Heavy copper and wire, No. 1 13.50-13.75; No. 2 12.50-12.75; light copper 11.50-11.75; No. 1 composition red brass 11.00-11.25; No. 1 composition turnings 10.25-10.50; mixed brass turnings 6.25-6.50; new brass clippings 10.50-11.00; No. 1 brass rod turnings 9.25-9.50; light brass 6.00-6.25; heavy yellow brass 7.25-7.50; new brass rod ends 9.75-10.00; auto radiators, unsweated 8.50-8.75; cocks and faucets, 8.50-8.75; brass pipe 9.00-9.25.

Lead: Heavy 8.00-8.25c; battery plates 3.50-3.75; linotype and stereotype 8.75-9.00; electrotype 8.25-8.50; mixed babbitt 8.00-8.25.

Zinc: Old zinc 4.25-4.75; new die cast scrap 4.00-4.50; old die cast scrap 3.00-3.25.

Tin: No. 1 pewter 39.00-41.00; block tin pipe 60.00-62.00; No. 1 babbitt 30.00-32.00.

Aluminum: Clippings 2S nominal; old sheets nominal; crankcase nominal; borings and turnings nominal.

IRON AND STEEL SCRAP

Consumer prices, except as otherwise noted, including brokers' commissions, as reported to STEEL, Mar. 16, 1950; gross tons except as noted. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Mar. 16	$28.00
Mar. 9	27.50
Feb. 1950	27.52
Mar. 1949	34.60
Mar. 1945	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 Heavy Melt.	*$32.00**
No. 2 Heavy Melt.	*29.00**
No. 1 Busheling	*32.00**
No. 1 Bundles	*32.00**
No. 2 Bundles	24.00-25.00*
No. 3 Bundles	23.00-24.00*
Heavy Turnings	26.00-27.00
Machine Shop Turnings	22.00-22.50†
Mixed Borings, Turnings	22.00-22.50†
Short Shovel Turnings	25.00
Cast Iron Borings	24.00-25.00
Low Phos. Steel	34.00-35.00*

Cast Iron Grades*

No. 1 Cupola Cast	34.00-35.00
No. 1 Machinery Cast	38.00-39.00
Charging Box Cast	31.00-32.00
Heavy Breakable Cast	29.00-30.00

Railroad Scrap

No. 1 R.R. Heavy. Melt	33.00
Axles	35.00-36.00
Rails, Random Lengths	35.50-36.00
Rails, 2 ft. and under	39.00-40.00
Rails, 18 in. and under	40.00-41.00
Railroad Specialties	35.50-36.00
Angles, Splice Bars	37.00-38.00*

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* Nominal.

† Crushers' buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	$28.00-28.50
No. 2 Heavy Melt. Steel	25.50-26.00
No. 1 Busheling	28.00-28.50
No. 1 Bundles	28.00-28.50
No. 2 Bundles	22.00-22.50
Machine Shop Turnings	18.00-18.50
Mixed Borings, Turnings	21.00-21.50
Short Shovel Turnings	21.00-21.50
Cast Iron Borings	21.00-21.50
Low Phos.	29.00-29.50
Cut Structurals	31.00-31.50

Cast Iron Grades

No. 1 Cupola	*42.00-43.00*
Charging Box Cast	38.00-39.00
Stove Plate	35.50-36.50
Heavy Breakable Cast	*32.00-32.50*
Unstripped Motor Blocks	31.00-32.00
Brake Shoes	28.50-29.50
Clean Auto Cast	*42.50-43.50*
No. 1 Wheels	36.50-37.00
Burnt Cast	33.00-33.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.50-33.00
R.R. Malleable	38.50-39.00
Rails, 3 ft and under	41.00-42.00
Rails, 18 in. and under	43.00-44.00
Rails, Random Lengths	38.00-39.00
Cast Steel	34.00-35.00
Railroad Specialties	35.00-35.50
Uncut Tires	36.00-37.00
Angles, Splice Bars	41.00-41.50

VALLEY

No. 1 Heavy Melt. Steel	$31.50-32.00
No. 2 Heavy Melt. Steel	29.00-30.00
No. 1 Bundles	31.50-32.00
No. 2 Bundles	24.50-25.50
Machine Shop Turnings	21.50-22.50
Short Shovel Turnings	23.50-24.00
Cast Iron Borings	23.50-24.00
Low Phos.	32.50-33.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	33.00-33.50

PHILADELPHIA

No. 1 Heavy Melt. Steel	*$24.00*
No. 2 Heavy Melt. Steel	*22.00*
No. 1 Busheling	*22.00*
No. 1 Bundles	*24.00*
No. 2 Bundles	*19.00*
Machine Shop Turnings	15.50
Short Shovel Turnings	*18.50*
Mixed Borings, Turnings	15.00-15.50
Low Phos. Punchings and Plate, elec. fur. grade	26.50-27.50
Cut Structurals	25.50-26.00
Elec. Furnace Bundles	*25.00*
Heavy Turnings	*24.00*
No. 1 Chemical Borings	29.00
Knuckles and Couplers	29.00-30.00
Steel car wheels	29.00-30.00

Cast Iron Grades

No. 1 Cupola Cast	*31.00-32.00*
No. 1 Machinery Cast	36.00-37.00
Charging Box Cast	*34.00-35.00*
Heavy Breakable Cast	*34.00-35.00*
Unstripped Motor Blocks	25.00
Clean Auto Cast	36.00-37.00
No. 1 Wheels	*38.00*
Malleable	*39.00-40.00*

CINCINNATI

No. 1 Heavy Melt. Steel	$27.00
No. 2 Heavy Melt. Steel	23.00
No. 1 Busheling	27.00
No. 1 Bundles	27.00
No. 2 Black Bundles	23.00
No. 3 Bundles	18.00
Machine Shop Turnings	14.00
Short Shovel Turnings	17.00
Mixed Borings, Turnings	16.00
Cast Iron Borings	17.00

Cast Iron Grades

No. 1 Cupola Cast	38.00
Charging Box Cast	36.00
Stove Plate	28.00
Heavy Breakable Cast	32.00
Unstripped Motor Blocks	22.00
Brake Shoes	22.00
Clean Auto Cast	38.00
Drop Broken Cast	42.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	30.00
R.R. Malleable	33.00
Rails, Rerolling	34.00
Rails, Random Lengths	33.00
Rails, 18 in. and under	42.00

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	$21.00-22.00
No. 1 Bundles	25.00-26.00
No. 2 Bundles	20.00-21.00
No. 1 Busheling	24.00-25.00
Machine Shop Turnings	13.00-14.00
Mixed Borings, Turnings	13.00-14.00
Short Shovel Turnings	15.00-16.00
Cast Iron Borings	16.00-17.00
Punchings & Plate Scrap	24.00-25.00

Cast Iron Grades

No. 1 Cupola Cast	33.00-34.00
Heavy Breakable Cast	29.00-30.00
Clean Auto Cast	35.00-36.00

BUFFALO

No. 1 Heavy Melt. Steel	$28.00-28.50
No. 2 Heavy Melt. Steel	25.50-26.00
No. 1 Bushelings	25.50-26.00
No. 1 Bundles	26.50-27.00
No. 2 Bundles	24.00-24.50
Machine Shop Turnings	18.00-18.50
Mixed Borings, Turnings	19.00-19.50
Cast Iron Borings	19.00-19.50
Short Shovelings	19.50-20.00
Low Phos.	29.00-29.50

Cast Iron Grades

No. 1 Machinery	35.00-36.00
No. 1 Cupola	30.50-31.50
Stove Plate	29.50-30.50
Malleable	31.00-32.00

Railroad Scrap

Rails, 2 ft. and under	38.00-39.00
Scrap rails	35.00-35.50
Specialties	33.00-34.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$21.50-22.00*
No. 2 Heavy Melt. Steel	*17.50-18.50*
No. 1 Busheling	*17.50-18.50*
No. 1 Bundles	*21.50-22.00*
No. 2 Bundles	16.00
Machine Shop Turnings	*11.00-11.50*
Mixed Borings, Turnings	*11.00-11.50*
Short Shovel Turnings	*12.50-13.00*
Punchings & Plate Scrap	*21.50-22.00*
Cut Structurals	*21.50-22.00*
Elec. Furnace Bundles	*21.50-22.00*

Cast Iron Grades

No. 1 Cupola Cast	25.00-25.50
No. 1 Machinery	26.00-27.00
Charging Box Cast	*26.00-26.50*
Heavy Breakable	*26.00-26.50*
Unstripped Motor Blocks	*20.00*
Malleable	34.00

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	$20.00-20.50
No. 2 Heavy Melt. Steel	*17.00-17.50*
No. 1 Bundles	19.00-20.00
No. 1 Busheling	*19.00-19.50*
Machine Shop Turnings	11.00-11.50
Mixed Borings, Turnings	10.50-11.00
Short Shovel Turnings	13.00-13.50
Bar Crops and Plate	21.00-22.00
Punchings & Plate Scrap	21.00-22.00
Chemical Borings	19.00-19.50

Cast Iron Grades

No. 1 Cupola Cast	27.50-30.50
Mixed Cast	21.00-22.00
Heavy Breakable Cast	24.50-25.50
Stove Plate	21.50-22.50
Unstripped Motor Blocks	17.50-18.50

CHICAGO

No. 1 Heavy Melt. Steel	$28.00
No. 2 Heavy Melt. Steel	26.00
No. 1 Bundles	28.00
No. 2 Bundles	24.00
Machine Shop Turnings	*17.00-18.00*
Mixed Borings, Turnings	19.00-20.00
Short Shovel Turnings	20.00-21.00
Cast Iron Borings	19.00-20.00
Low Phos.	30.50-31.50
Elec. Furnace Bundles	27.00-28.00
Heavy Turnings	23.00-24.00
Cut Structurals	29.00-30.00

Cast Iron Grades

No. 1 Cupola Cast	40.50-41.50
Clean Auto Cast	41.50-42.50
No. 1 Wheels	36.00-37.00
Stove Plate	31.50-32.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	29.00-30.00
Malleable	35.00-36.00
Rails, Rerolling	*45.00-46.00*
Rails, Random Lengths	*35.00-36.00*
Rails, 2 ft and under	39.00-40.00
Rails, 18 in. and under	40.00-41.00
Railroad Specialties	32.00-33.00
Angles, Splice Bars	35.00

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*Nominal.

BIRMINGHAM

No. 1 Heavy Melt. Steel	$24.00
No. 2 Heavy Melt. Steel	22.00
No. 1 Busheling	22.00
No. 2 Bundles	20.00
Machine Shop Turnings	22.50
Mixed Borings, Turnings	17.00
Short Shovel Turnings	23.00
Cast Iron Borings	19.00
Bar Crops and Plate	27.00-28.00
Cut Structurals	27.00-28.00

Cast Iron Grades

No. 1 Cupola Cast	35.00
Stove Plate	30.00
No. 1 Wheels	nominal

Railroad Scrap

No. 1 R.R. Heavy Melt.	25.00-26.00
R.R. Malleable	nominal
Rails, Rerolling	33.00-35.00
Rails, 3 ft and under	nominal
Angles and Splice Bars	nominal

ST. LOUIS

No. 1 Heavy Melt. Steel	$28.00-29.00
No. 2 Heavy Melt. Steel	24.00-25.00
Machine Shop Turnings	14.00-15.00
Short Shovel Turnings	18.00-19.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00
Charging Box Cast	*30.00-31.00*
Heavy Breakable Cast	29.00-30.00
Brake Shoes	*29.00-30.00*
Clean Auto Cast	36.00-38.00
Burnt Cast	*29.00-30.00*

Railroad Scrap

R.R. Malleable	31.00-33.00
Rails, Rerolling	*40.00-41.00*
Rails, Random Lengths	30.00-31.00
Rails, 3 ft. and under	35.00-36.00
Uncut Tires	27.00-28.00
Angles, Splice Bars	32.00-33.00
Railroad Specialties	30.00-31.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos 1 & 2 Bundles	16.00
No. 3 Bundles	13.00
Machine Shop Turnings	9.00

Cast Iron Grades

No. 1 Cupola Cast	*30.00-35.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Random Lengths	20.00

SEATTLE

No. 1 Heavy Melt. Steel	$18.00
No. 2 Heavy Melt. Steel	18.00
No. 1 Busheling	15.50
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	13.00
Mixed Borings, Turnings	13.00
Punchings & Plate Scrap	27.50
Cut Structurals	27.50

Cast Iron Grades

No. 1 Cupola Cast	25.00-27.50
Heavy Breakable Cast	25.00
Stove Plate	25.00
Unstripped Motor Blocks	18.00
Malleable	25.00
Brake Shoes	20.00
Clean Auto Cast	27.50
No. 1 Wheels	27.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	19.00
Railroad Malleable	25.00
Rails, Random Lengths	19.00
Angles and Splice Bars	19.00

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	9.00
Mixed Borings, Turnings	9.00
Punchings & Plate Scrap	26.00

Cast Iron Grades

No. 1 Cupola Cast	30.00-33.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Rerolling	32.00

HAMILTON, ONT.

(Delivered prices)

Heavy Melt.	$24.00
No. 1 Bundles	24.00
Mechanical Bundles	22.00
Mixed Steel Scrap	20.00
Mixed Borings, Turnings	18.00
Rails, Remelting	24.00
Rails, Rerolling	27.00
Busheling	18.00
Bushelings new factory, prep'd	22.00
Bushelings new factory, unprep'd	17.00
Short Steel Turnings	18.00

Cast Iron Grades

Cast	40.00-43.00*

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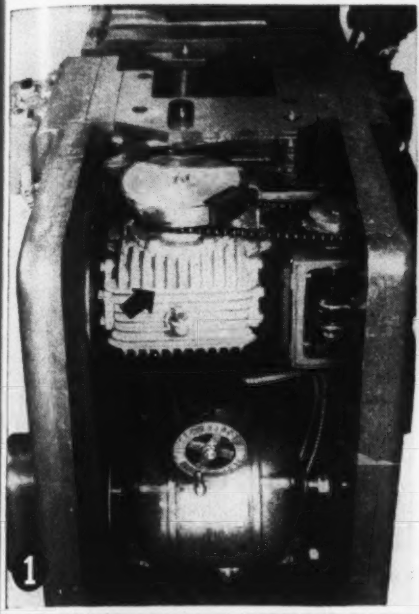
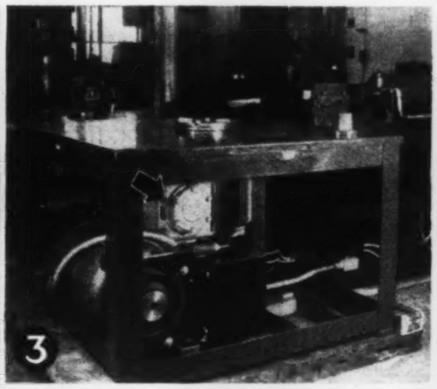
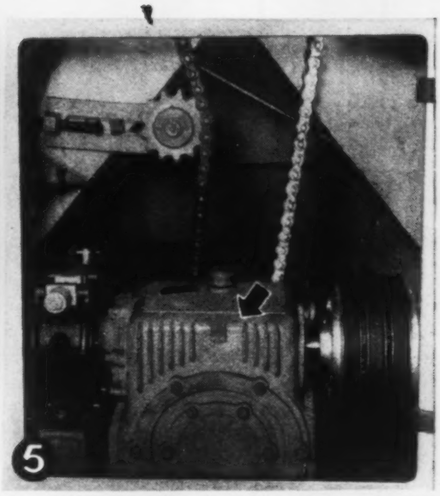
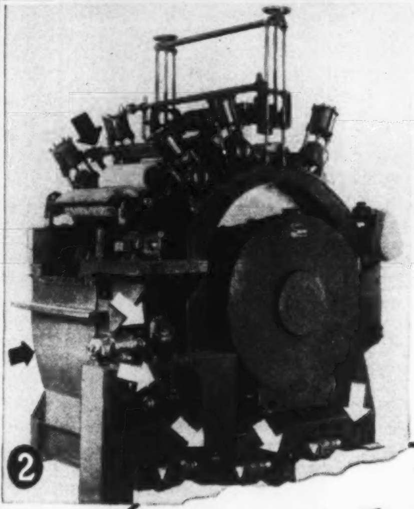
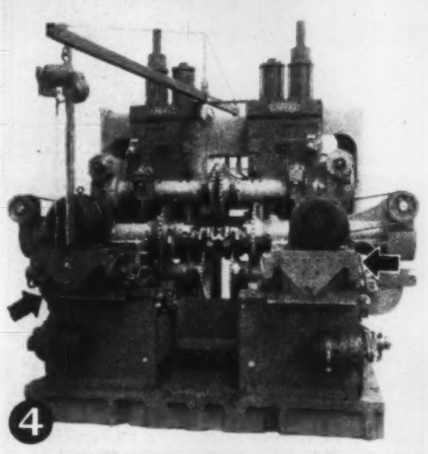
* F.o.b. shipping point.

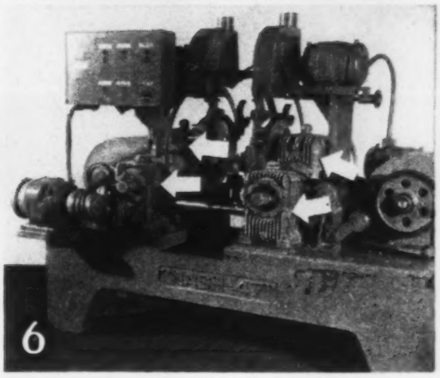












1. *PROGRESSIVE flash welder*
2. *OLIVER board former*
3. *HANCOCK power bender*
4. *GISHOLT crankshaft miller*
5. *JENSEN dairy churn*
6. *NASH double end automatic wood facing machine*

COMPACT STANDARD REDUCERS CUT COST OF MACHINE DRIVES

Latest wrinkle in machine design and construction is to use standard stock Cone-Drive Gears reducers instead of "built-in" gearing.

Made possible by the high load carrying capacity and extreme compactness of double enveloping Cone-Drive gearing, the idea does away with special gear designing and bearing calculations, plus the necessary machining of castings, assembling of gears, shafts, bearings, etc.

The variety of machines on which the standard stocked Cone-Drive Gears reducers have simplified and reduced the cost of machine drives is indicated by the examples shown here.

Where, for some reason, use of completely assembled "ready-to-install" speed reducers is not feasible, machine designers in increasing number are specifying STANDARD Cone-Drive Gears, complete with STANDARD MOUNTINGS.

Either way, Cone-Drive Gears give you a lower cost per horsepower.

It will cost you nothing to find out how much easier and less costly you can make your machine drives. How about doing it today?

CONE-DRIVE GEARS

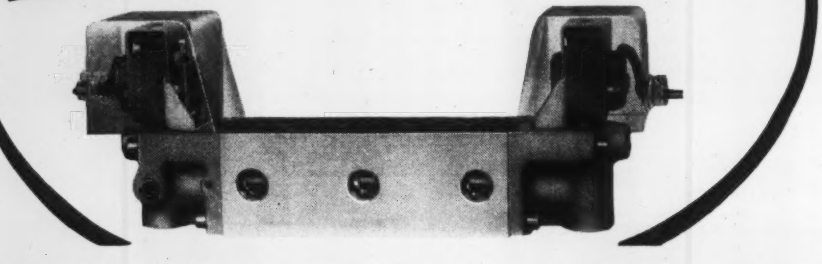
Division, Michigan Tool Company

DOUBLE ENVELOPING GEAR SETS & SPEED REDUCERS

7171 E. McNichols Road • Detroit 12, U.S.A.

another NEW Quick-As-Wink development

Type "DS" double solenoid pilot operated single plunger control valve



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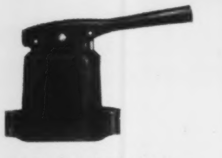
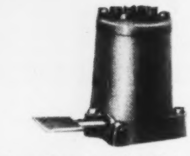
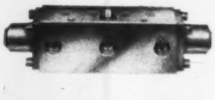


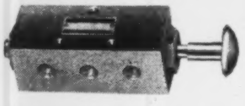
Hand Operated Air Valves—wide variety of uses. 2-way, 3-way, 4-way neutral position and compound exhaust.



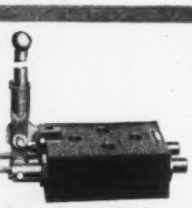
Foot Operated Air Valves—workman has both hands free, speeding production. 2-way, 3-way and 4-way actions.



Single Plunger Valves—for air or low pressure hydraulic service. Lever, pilot, cam, diaphragm or solenoid operated. 2-way, 3-way, 4-way actions.



Series "O" and "OE" Valves—for air or hydraulic service up to 125 PSI. Push-pull, cam, pilot, diaphragm and solenoid operated. 1/8" and 1/4" pipe connections. 2-way, 3-way, 4-way and 5-way actions.



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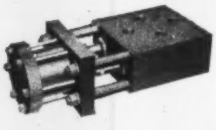

Hydraulic Valves—Up to 5000 PSI. Pilot cylinder operated. 1/2", 3/4", 1", 1 1/2" 2", 2 1/2" 3" and 4" sizes. 2-way, 3-way, 4-way actions.

Quick-As-Wink Control Valves

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Sheets Strip . . .

Sheet and Strip Prices, Page 123 & 12

Cleveland—Those market observers who had predicted a downturn in sheet mill activity by end of June are revising their views. The slowing down in finishing mill operations because of the coal strike pushed sheet deliveries further into the future. It appears now producers are holding enough business on books to keep them going at top production pace well into August. Carryover of tonnage into second quarter will be substantial, and this means opening of third quarter books probably will be delayed.

Little hope is held out for any easing in tight supply conditions over the next three or four months. As a result conversion business is on the increase.

The Whitney Apollo Corp., Apollo Pa., is offering hot-rolled annealed and galvanized sheets in this market for May-June delivery.

Boston — Revisions in April sheet and strip rolling schedules will reduce consumer tonnage in varying degree. Carryovers into second quarter will be heavier than anticipated. Inventories continue unbalanced and consumers are pressing for tonnage. The end of the coal strike left hardly two producers alike as to scheduling pattern.

Philadelphia — While some sheet mills have not formally made allocations beyond May, it appears most are booked with more tonnage than they can possibly turn out during the first half.

Pittsburgh—Sellers are increasingly optimistic, predicting continuation of current pressure for the entire output of the industry's production facilities for remainder of the year. Discounting buying pressure prompted by recent curtailment of finished steel production schedules, industry members contend metalworking customers are stepping up operations.

Follansbee Steel was the last of silicon steel producing interests in reducing electrical grade sheets $5 per ton effective Mar. 15.

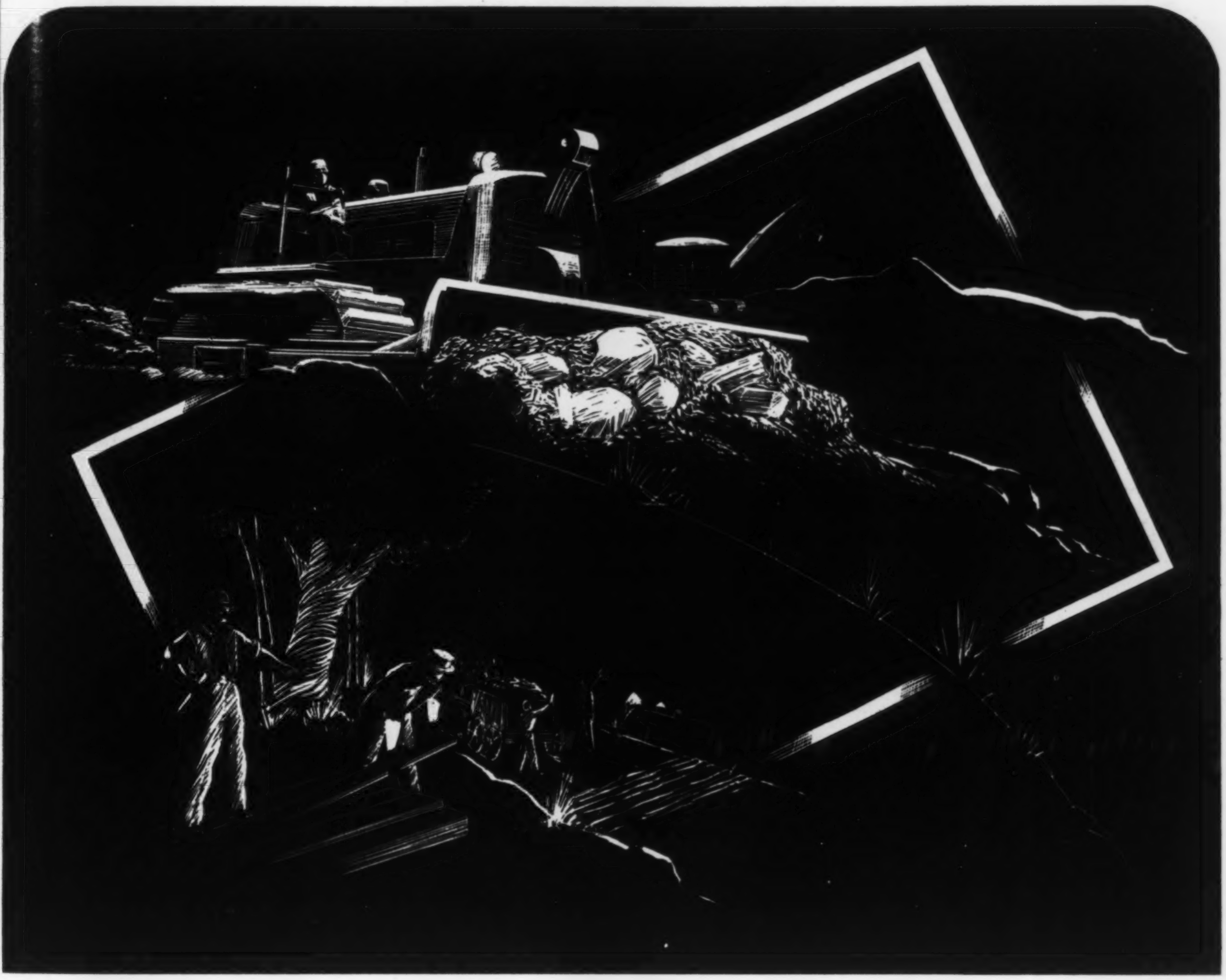
Cincinnati—Demand for sheets is stronger. Hesitancy and curtailments among fabricators has faded. District mills expect the pinch in coated sheets to last throughout the year.

Chicago—Steel users will have to spread their stocks further. Mills are making it clear that supply instead of loosening has tightened. One important mill is notifying customers this quarter's flat-rolled tonnage will not all be delivered until end of July. The extra month's entire production will be taken up with eliminating the indicated carryover.

Only "out" for many consumers has been conversion. Within the past two weeks numerous small companies have arranged for rolling space with local mills. Contrary to previous deals, which involved large companies in the automotive, farm implement and appliance fields, latest are in widely diversified lines.

Shortage of sheets will delay one midwestern appliance maker introducing a clothes drier to the market. Several other appliance companies have pared production schedules.

New York — Continued pressure for sheets for the larger home ap-



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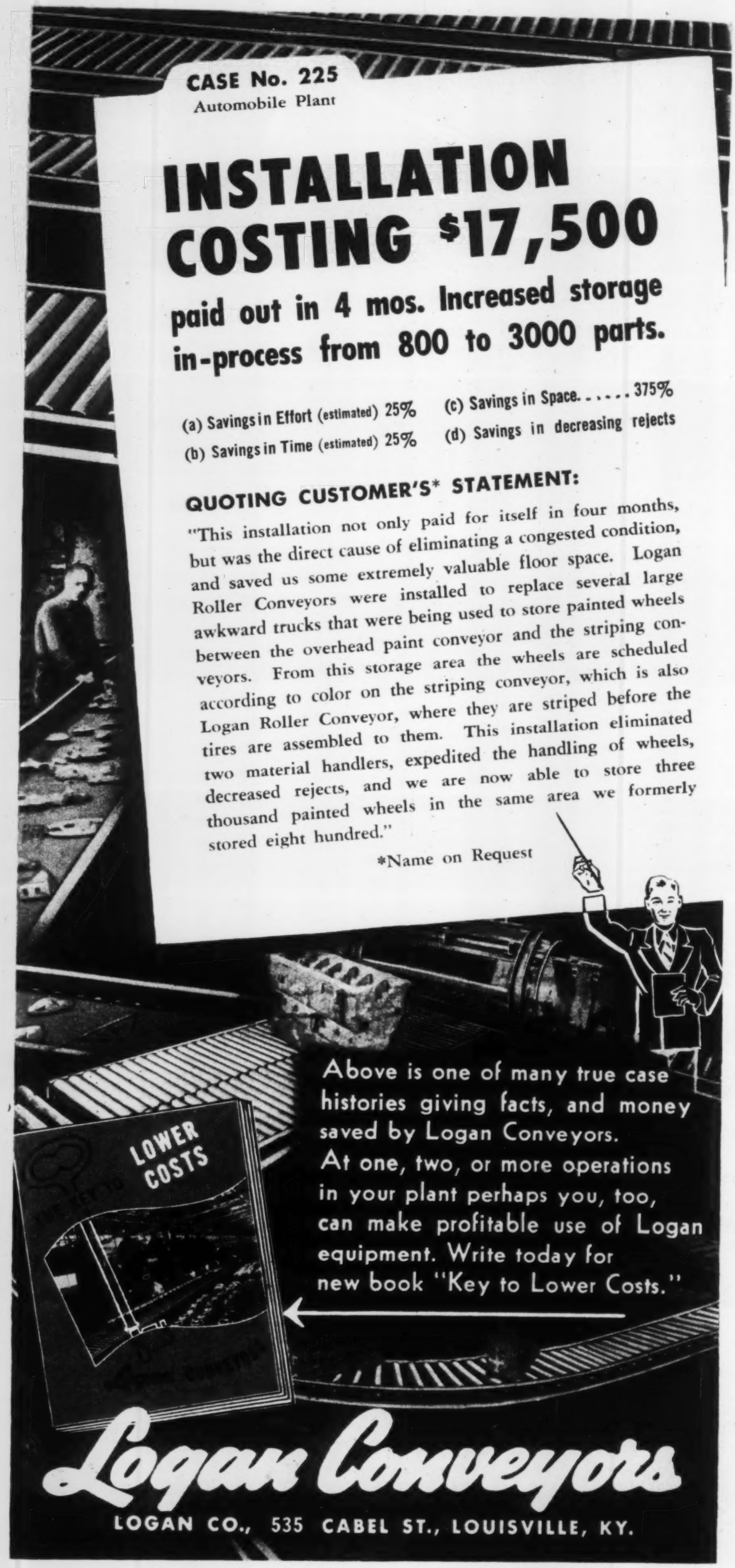

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pliance items is more than offsetting slightly easier requirements for the smaller appliances. Overall demand for hot and cold and galvanized sheets, is far in excess of supply.

Steel Bars . . .

Bar Prices, Page 123

Boston—Mild improvement in carbon bar demand, largely hot-rolled, is accompanied by more extended deliveries. Some grades, notably free machining, high-sulphur bessemer, are booked into June. Cold drawers and forge shops are taking more tonnage. Alloy demand lags behind carbon. Watertown arsenal closes Mar. 27 on 1000 tons of carbon bars for remelting.

Philadelphia—Hot carbon bar sellers are quoting more extended deliveries. Some are quoting into June on certain sizes. There is better demand from the railroads and cold drawers, and while the warehouses appear to have stocks in fair balance, they are still specifying freely. Small district forge shops have stepped up specifications slightly.

Pittsburgh—Output of hot-rolled and cold-finished carbon and alloy bars returned to normal by close of last week. However, heavier demand is noted in Chicago district for hot-rolled bars than among eastern mills as reflected in extended delivery schedules. Few if any consumers were forced to curtail production due to loss in mill output over the past few weeks. No let-up in demand is noted.

New York—Some hot carbon bar sellers are booked into June on small flats and rounds. They also are extending their deliveries on the medium and heavier grades, quoting anywhere from seven to eight weeks.

Cleveland—Carbon bar sellers are still accepting tonnage for second quarter shipment. Deliveries can be had in six to eight weeks though supply conditions are slightly tighter than they were prior to finishing mill curtailments due to the coal strike. The mills are holding substantial bookings, believed sufficient to support high-level operations well through second quarter Recent production losses are expected to be made up quickly once the mills get back into full operation.

Chicago—Demand for carbon bars is strong from nearly all directions, the coal strike and mill curtailments having served to heighten it. One Chicago mill finds it impossible to meet second quarter delivery promises and must prorate quotas from Apr. 1 through end of June over the additional month of July. Alloys are in only slightly lower demand. Bar mills appear fully booked, although one important outlet—warehouses—is not pressing as hard for prompt delivery as some large users.

Tin Plate . . .

Tin Plate Prices, Page 124

Pittsburgh—Close relationship between tin plate supply and demand is accentuated by loss in output toward close of the coal mine dispute. Producers are virtually again on a quota distribution basis, notably for electrolytic. Production outlook is bright through third quarter.

Plates . . .

Plate Prices, Page 123

New York—Plate buying is more active and diversified. Oil storage tank specifications are expanding seasonally and jobbers are showing better interest. Railroad buying is picking up.

Boston—While some plate deliveries are slightly more extended due to losses in semifinished production, those mills supplying the bulk of tonnage in this area are near schedules at three to four weeks. Demand is a trifle heavier for small tanks, but fabricating shops are slow to build inventories beyond actual backlog requirements

Philadelphia—Plate mill operations are expanding. Deliveries are somewhat more extended. While three weeks' shipment can be done on some sizes, the general average for district mills is around four to five weeks. Light gages continue in principal demand, reflecting in part improved specifications for oil storage tanks for filling stations.

In addition to 12,000 tons recently placed with an eastern plate mill by a midwest pipe fabricator, another similar sized tonnage has been placed by the same interest with another eastern mill.

Lukens Steel Co., Coatesville, Pa., plans to get its 206-in. plate mill, now down for electrification, into operation around Apr. 17.

Cleveland—Boilermakers have been taking fair tonnages but the market in this area lacks strong demand pressure. Eastern platemakers have been shipping tonnage into this district, in some instances absorbing part of the freight.

Chicago—Spring upturn in new oil tank construction is awaited by fabricators. Moderate increase in business is being reported by some. Pressure for plates was sharply higher while the coal strike threatened steel supply and now capacity of some mills is booked through June.

Houston—The new pipe mill of A. O. Smith Corp. of Texas, to begin operations Aug. 1, has booked in excess of 350,000 tons of 30-in. diameter pipe for the Houston to Chicago gas line.

Los Angeles—Although plates are in good supply, demand has increased moderately for ¼ in. and 3/16 in. and these gages currently are tight. Interruption of ingot supplies from Geneva Steel Co. has affected plate rollings by Columbia Steel Co. at Torrance, Calif.

Seattle — Plate fabricators report slow demand for tanks and boilers but prospects are improving.

Tubular Goods . . .

Tubular Goods Prices, Page 126

Pittsburgh—Loss in output of standard pipe has reduced jobbers' inventories substantially. Since recent demand has about matched production pace it will take considerable time to make up the loss. Heavy order backlog for line pipe and oil country goods shows no signs of diminishing.

Seattle—Demand for cast iron pipe is below normal, sellers meeting keen competition from other types of material.

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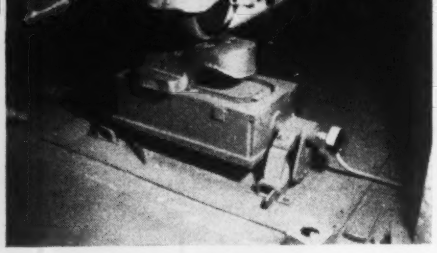

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Pig Iron . . .

Pig Iron Prices, Page 122

Boston—Outside furnaces normally selling here again are taking orders, but buying is slow. Foundry melt continues at low level. Inventories appear sufficient to maintain melting schedules. Second quarter prices for Mystic No. 2 foundry and malleable iron are expected shortly.

Philadelphia — Pig iron specifications are picking up, now that the AFL strike, which had closed down a number of foundries here for nine weeks, has been settled. At the same time, though, a labor dispute threatens to close down a large district pipe shop this week. Pig iron production is increasing but there are no signs of over-production. Oven coke production also is swinging back rapidly.

Pittsburgh—Pig iron output has bounded to levels in excess of the pace in effect prior to the coal strike curtailments. Crucible Steel and Pittsburgh Steel have brought into service one additional blast furnace each, idle for some time. U. S. Steel is expected to decide soon to what extent hot metal open hearth charge will be increased.

Lone merchant foundry iron producer here will not advance prices immediately to offset higher production costs.

Buffalo—Foundries are slow calling for deliveries against improved bookings placed for merchant iron. Some disappointment is apparent among sellers over failure of a more pronounced upswing in deliveries after settlement of the coal strike. While the coke pinch is far from ended, it is generally felt this condition has improved to warrant a more active pickup in buying.

Cleveland—Blast furnace operations in this immediate district are at the rate of 88 per cent. Eight of the nine stacks in the district are in blast, and the ninth will be blown in shortly bringing operations to 100 per cent for the first time since the last week in November. American Steel & Wire Co. added one stack to the active list last week and Republic Steel Corp. is planning to blow in its one idle stack shortly.

Shipments of merchant iron on contract are going ahead steadily. Ending of the coal strike and resumption of idle blast furnaces have removed any threat of a shortage over coming months. Consequently, new buying has fallen back to the pattern prevailing before the production curtailment.

Whether pig iron prices will be affected by the recent increase in iron ore prices and the possible rise in coke prices is uncertain. Since pig iron was not advanced last December when most steel products were raised it would not be surprising if iron were raised slightly to offset still rising costs.

Youngstown—Twenty of the 25 blast furnaces in this district are again in operation. Youngstown Sheet & Tube Co. has put on two stacks at its Brier Hill works and 1 stack at its Campbell works. Republic Steel resumed operation of its No. 1 stack here last Monday and Carnegie-Illinois Steel started up 5 blast furnaces at its Ohio works. Sharon Steel resumed operation of its Lowellville stack Mar. 11, and put full blast on its No. 2 stack at Farrell. Pittsburgh Coke & Iron started up its banked Struthers blast furnace.

Cincinnati — Furnace representatives in this district look for early improvement in pig iron demand. Foundry stocks are below normal, and some replenishment buying is expected. Reports also point to expanding melt in second quarter.

Chicago — Overestimation of the size of coal stocks at one iron producer here caused that interest last week to cancel its plans for increasing the volume of blast. Not until Apr. 1 can normal output be expected. Youngstown Sheet & Tube's two blast furnaces at Indiana Harbor were returned to blast Mar. 12. Carnegie blew in its No. 8 furnace at South Works, Mar. 10. This unit had been down for stockhouse repairs. Inland will blow in its relined No. 2 furnace about Mar. 22 to produce malleable iron initially. The district has 35 stacks in blast.

St. Louis—Iron production is returning to normal here, although slower than expected. Blast furnaces and coke ovens probably will be back to capacity operations this week. Pressure for iron is greater now than at any time in recent months.

Structural Shapes . . .

Structural Shape Prices, Page 123

Boston—Fabricating shops are operating largely on bridge and public work contracts. Competition for bridge tonnage is sharp, reflected in prices for steel in place. Low contractor bid on two stringer bridges, Boston and Somerville, 915 tons, was 10.50c against engineer's estimate of 21.00c. Highest bid was 15.00c.

Philadelphia — Structural activity continues to improve. A fair sprinkling of orders is noted, along with steadily mounting inquiry, mostly of public character. Deliveries are more extended.

Chicago—High level building activity, weighted heavily by new house construction, obscures to some extent the real difficulties of many fabricators. Only a few truthfully say conditions are good. It is not the lack of jobs currently, but rather the low bids which these attract. Several shops feel it is better not to seek contracts than to take them at present price levels.

Seattle—Fabricating plants report normal operations and fair backlogs, although some specialty shops are short of orders. Largest project pending involves 1550 tons for Longview bridge approaches. Delivery of some items has been delayed by the recent coal strike.

Rails, Cars . . .

Track Material Prices, Page 125

Seattle—General Services Administration called bids Mar. 20 for 45,000 tons 115-lb rail to replace 70-lb rail on 226 miles of Alaska railroad, first delivery, 5000 tons by May 1, final delivery Apr. 1, 1951. Project also includes 10,000 tons of tie plates and other materials.

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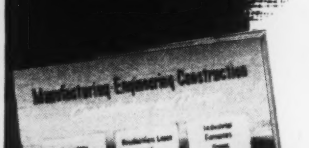
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Scrap . . .

Scrap Prices, Page 130

Pittsburgh—The market is stronger despite absence of large purchases. Integrated mills are turning down dealers' offers of No. 1 heavy melting steel at $32. However, brokers are bidding up to $32 for local No. 1 steel to fill old orders. Remote scrap from New Jersey is being shipped to a local mill in excess of $32.

New York — Brokers have advanced buying prices on several grades. Material, particularly steel scrap, has been coming into the yards slowly and now as consumer demand, especially from the Pittsburgh area, has picked up rather sharply, brokers are offering more in an effort to meet requirements.

Boston—Somewhat firmer tendency in steelmaking scrap is noted for No. 2 heavy melting and top grade busheling with higher bracket of $20.50, shipping point, paid for No. 1 more frequently. No. 2 steel brings $17 more often and No. 1 busheling $19-$19.50.

Philadelphia—Nominally No. 1 melting steel and No. 1 bundles are now $24, delivered, and No. 2 heavy melting steel and No. 1 busheling $22. No. 2 bundles are nominally higher at $19, delivered, and short shovel turnings at $18.50. Heavy turnings are nominally higher at $24, delivered, and business has been done in electric furnace bundles at an increase of 50 cents, to $25.

Buffalo—Although inertia grips the scrap market, a stronger undertone prevails to support the nominal price structure. One leading consumer has expressed willingness to place new orders within prevailing ranges.

Cleveland—Noticeably stronger tone is evident in the scrap market in this district but steelmaking grades are unchanged with No. 1 heavy melting holding at $28-$28.50. However, heavy consumption of scrap during the coal strike depleted mill inventories to some extent and replenishment is expected over coming weeks.

Detroit—Some of the wildfire running through the scrap trade last week appears to have died out. Hints are heard of cancellations being issued on ingot conversion contracts made earlier by automotive steel buyers.

Cincinnati—Iron and steel scrap prices are unchanged. Mills, fortified for the near position, are not entering the market although they are taking in tonnage steadily on old orders.

Chicago — Despite strong feeling among traders that prices would rise with new purchases, one mill has been able to contract for No. 1 and No. 2 heavy melting at $28 and $26, respectively.

St. Louis—Cast scrap prices are moderately firmer. Foundries, which have bought hand-to-mouth for several months, are taking a little more tonnage. Charging box cast and brake shoes moved up $1 and burnt cast $2. Rerolling rails are $4 higher as scarcities due to railroads' limited winter maintenance work are felt.

Seattle—Volume of sales is below normal, larger buyers limiting purchases to immediate requirements.

Warehouse . . .

Warehouse Prices, Page 127

Boston—With tonnage revised downward warehouse inventories of heavier carbon products are less balanced than anticipated. Buying, except for flat-rolled, is spotty. Stocks of lighter gage cold-rolled sheets are insufficient for demand.

Philadelphia—Warehouses are confident business this month will be the best so far this year. February showed a slight gain over January and current volume, on a daily average, is equally as good, if not better, than last month.

Pittsburgh — Warehouse steel demand fluctuated little in recent weeks despite actual reduction in mill finished steel shipments. Distributors' stocks, excluding sheets and strip, are more than ample to tide them over the current period in which mills are attempting to bring finished steel production schedules back to normal. Some distributors expect substantial improvement in steel shipments for coal mining equipment over coming months.

Cleveland — Warehouse order volume is fair but it is disappointing to some distributors. Settlement of the coal strike removed consumers' fears of being caught short on supplies, and a slackening in demand pressure has resulted. Generally, March business will be substantially better than that of February. At least that is normal seasonal experience and this year is not likely to depart from the regular demand pattern.

Cincinnati — Sales of steel from warehouse are in good volume. Distributors report demand for structurals is gaining.

Los Angeles—Distributor sales are gaining, the improvement being due to stronger tone in general business conditions. Inquiries are more numerous, and tonnages larger. But specifying remains close to requirements. Warehouse stocks of sheets are slim.

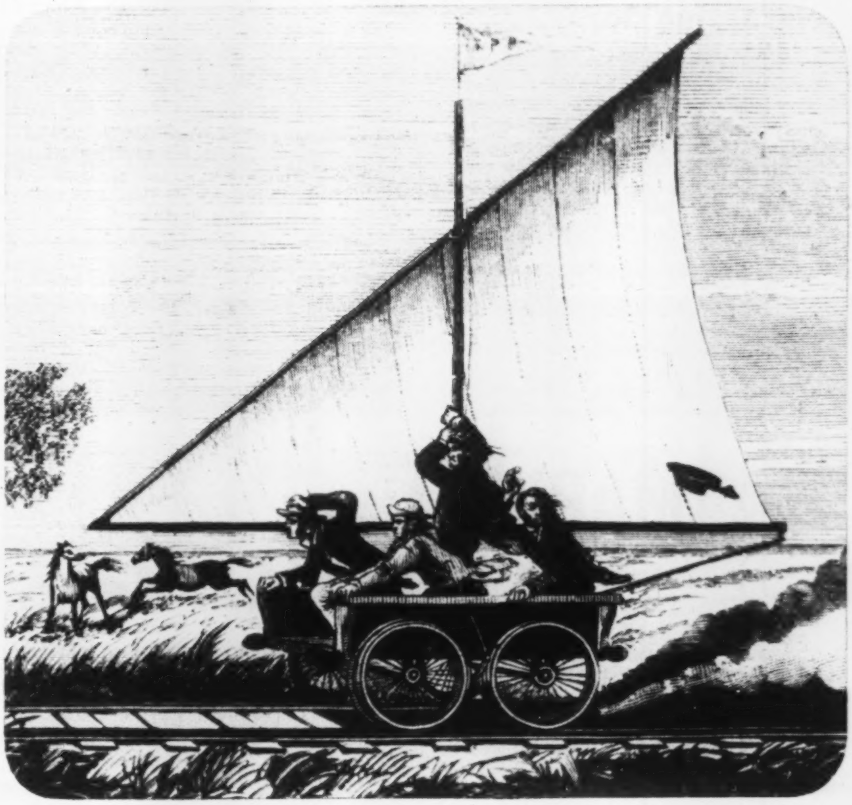
Seattle — Warehouses note market improvement, small orders predominating, but total volume is not up to normal seasonal levels. Stocks are well rounded except for hot and cold rolled sheets. Business is expected to enlarge as outside construction expands.

Ferroalloys . . .

Ferroalloy Prices, Page 127

New York—Chrome ore prices are easier on some grades. South African Transvaal 45 per cent no ratio material is now \$17.00-\$18.00 per gross ton f.o.b. cars, eastern seaboard, the same as for 44 per cent no ratio material. Rhodesian, 48 per cent no ratio ore is off sharply to \$25, and Rhodesian 48 per cent 3-1 lump, is off \$1 to \$35 to \$36.

New York—Ferrocolumbium prices have been advanced, on spot immediately, and on contracts Apr. 1. New contract price is \$3.50 per lb contained on ton lots, and \$3.55 on less ton lots. Spot prices are 10 cents higher. Formerly ton lots were quoted \$2.90 and less ton lots \$2.95.



The Bettmann Archive

Sails on Rails

This wind wagon of the 19th Century looks weirdly out of place in our age of streamliners and silver wings. Yet, it is an example of many of the early but generally impractical ideas that were explored in the endless search for better power to move machines.

Paralleling man's search for better power has been his equally determined hunt for better ways to transmit power. And like the wind wagon, many power transmission ideas have left much to be desired.

But tackling and *solving* problems of power transmission . . . finding *practical*, more efficient methods of harnessing power . . . has been a specialty with the Twin Disc Clutch Company for 31 years.

Today, wherever power is applied . . . in all types of construction, lumber, petroleum, farm equipment, marine and machine tool applications . . . Twin Disc "know-how" has perfected a *proved* product to handle the job. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).

Power Take-off

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CLUTCHES AND HYDRAULIC DRIVES
REG. U. S. PAT. OFF.

Machine Tool Clutch

Marine Gear

SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 123

Boston—Substantial ratio of highway programs include concrete bridges. Close to 5000 tons of reinforcing bars remain to be bought for Massachusetts requirements with more inquiry coming out, notably for completion of the Plymouth, Mass., by-pass, bids Apr. 4. Heavier volume is developing in Connecticut. Most contractors quote 10.00c per lb in estimates on bridge work, but 8.50c and 9.00c for new billet bars are frequently inserted.

Cleveland—Quickening in demand for reinforcing bars is expected with the return of spring. Numerous projects, especially public buildings, are seen coming out for bids shortly.

Los Angeles—Mill operations are running close to demand, with deliveries ranging 1 to 3 weeks. Fabricators report bookings at a good level, greatest volume stemming from bridges, followed by state highways, flood control projects, and small industrial construction. Big Hastings Reservoir, being excavated near Pasadena, Calif., will require 1200 tons.

Seattle—Inquiry for reinforcing bars is strong, many projects of less than 100 tons each being figured. Backlogs are fair. Both local mills are on reduced operating schedules.

Bids are called Apr. 3 for a proposed 10-story concrete construction state office building at Portland, Oreg.

Only **MARVEL** *builds all four**

*HACK SAWING MACHINES
*BAND SAWING MACHINES
*BAND SAW BLADES
*HACK SAW BLADES

While it is true there are several builders of hack sawing machines and many builders of band sawing machines, only **MARVEL** builds **BOTH** hack saws and band saws. The fact is that **MARVEL** manufactures 35 models of 10 basic types of metal sawing machines which include the world's fastest automatic production saw, the world's largest giant hydraulic hack saws, the world's most versatile band saw and the most widely used small shop saws.

With intimate and broad field experience in all types of metal cutting-off equipment and 35 different saws available, it is obvious that **MARVEL** Field Engineers occupy a unique and exclusive position in the industry. They are eminently qualified to make expert and unbiased recommendations covering the type, size and model of metal sawing equipment best suited to individual requirements—the most efficient, most accurate, fastest, broadest in scope and the most economical.

MARVEL is also the only manufacturer of both metal sawing machines and metal sawing blades. Because the efficiencies of both the machine and the blades are interdependent, each upon the capability of the other, expert knowledge covering both saws and saw blades is essential to the proper appraisal of any specific sawing situation. Correct balance of cutting speed and blade life, feed pressure and blade tension are all potent factors in overall performance. Here again it is the **MARVEL** Field Engineer who is qualified to provide the comprehensive answer to your question. His job is to help you saw metal most efficiently—his services are available upon request—gratis.

Write for Catalog 49

ARMSTRONG-BLUM MFG. CO.
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MARVEL *Metal Cutting* SAWS
No. 8A Marvel Hack Saw
No. 8 Marvel Band Saw
MARVEL High-Speed-Edge HACK SAW BLADE
MARVEL Metal-Cutting BAND SAW BLADE

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 126

Pittsburgh—Beehive furnace coke prices are up $1 to $14 to $14.50 per net ton; foundry grade up 50 cents to $15.50-$16.50. Neville Island, Pa., oven coke price is expected to advance $1 per ton around Apr. 1. Heavy demand for both beehive and oven foundry and furnace coke is indicated throughout the remainder of first half. H. C. Frick Coke Co. is planning to bring back into production this week 1400 beehive ovens to supplement production of coke at U. S. Steel Corp.'s Clairton Works.

Cleveland—Oven coke producers are marking time pending digesting of higher coal prices. With quality coking coal prices rising 25 to 30 cents per ton it is expected cokemakers will pass this increased cost along to consumers. Some trade interests would not be surprised if coke were upped $1 per ton. However, since an increase of $1 per ton was effected as recently as February it is believed an additional raise may be deferred for a few weeks.

Indianapolis—Foundry coke price was raised 90 cents to $20.75, effective Mar. 15. Chicago, Cincinnati, Detroit prices are up accordingly.

Wire . . .

Wire Prices, Page 125

Boston—Average delivery on most low carbon wire products is five to six weeks. High carbon and tempered grades are more extended. Capacity through second quarter is filled on numerous specialties. More low carbon volume extends into May. Some cold-heading stock is booked for June delivery.

Cleveland—Strong demand for wire products is being encountered. Farm requirements are expanding seasonally, and sharp pickup in building needs is anticipated over coming weeks. Production losses due to the coal strike have further extended shipments of most merchant and manufacturers' wire items.

Iron Ore . . .

Iron Ore Prices, Page 127

Cleveland—Lake shippers expect to move 80 million tons of iron ore in the 1950 Great Lakes shipping season. This will be the largest tonnage shipped in peacetime with the exception of 1948 when 84,700,000 tons came down from the head of the lakes. At the same time, the lake shippers expect to move 45 million tons of coal in the season, about 8 million more than in 1949.

Coal Chemicals . . .

Coal Chemical Prices, Page 126

Cleveland—Diamond Alkali Co. advanced the price of chlorine in multiple-unit tank cars 20 cents per 100 lb, effective immediately on spot business, and Apr. 1 on contracts. The new prices are: one car per year, $4.10 per 100 lb; two cars per year, $3.50; three cars or more, $2.90. Prices are f.o.b. Painesville, O., and Houston, Tex., with freight equalized. Shipments from Edgewood, Md., are 10 cents per 100 lb higher.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

[illegible]800 tons, state bridge work, schedules 1 and 2, Montgomery county, Pa., to Phoenix Bridge Co., Phoenixville, Pa.

1700 tons, 14-story Marylander apartments, University Place and Calvert St., Baltimore, to American Bridge Co., Pittsburgh, through Baltimore Contractors.

1700 tons, Patuxent River state bridge, near Benedict, Md., through Diamond Construction Co., to American Bridge Co., Pittsburgh.

1400 tons, state hospital, Middletown, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.

605 tons, warehouse, Smith, Kline & French, Philadelphia, through Barclay-White Co., that city, to Bethlehem Fabricators.

600 tons, state highway bridges, Burlington, Lexington, Mass., to West End Iron Works, Cambridge; Berke-Moore Co., Boston, subcontractor.

185 tons, bus garage, East Boston airport, to West End Iron Works, Cambridge, Mass.; Bossi Construction Co., Boston, general contractor.

165 tons, office and clinic, International Ladies Garment Workers Union, Philadelphia, through United Building Construction Co., general contractor, to Morris-Wheeler & Co., that city.

Unstated, 350-ton traveling crane, for McNary power house, to Willamette Iron & Steel Corp., Portland, low $330,556 to U. S. engineer.

STRUCTURAL STEEL PENDING

3300 tons, bridge, connecting Moon and Long Islands, Boston Harbor, Boston.

1600 tons, pier, Mystic docks, Port of Boston Authority.

1550 tons, approaches to Washington state Longview bridge; general contract to Guy F. Atkinson Co., Seattle, low $810,310.

1500 tons, pier, East Boston, Port of Boston Authority.

1100 tons, steel piling, Baltimore & Ohio pier, Baltimore, Empire Construction Co., general contractor; also 120 tons of reinforcing bars.

1005 tons, terminal, International Airport, Philadelphia, John McShain, Inc., that city, low on general contract.

750 tons, columns, runway, etc., Hungry Horse dam, also 125-ton gantry crane; plans by Bureau of Reclamation ready about Mar. 23.

600 tons, hospital, Johnstown, Pa., Berkebile Bros., that city, low on general contract.

250 tons, including piping and miscellaneous items, central heating plant, and shop, Grand Coulee dam, also 300 tons electric equipment; plans by Bureau of Reclamation ready about Mar. 20.

200 tons, warehouse, B. F. Goodrich, Oaks, Pa., bids Mar. 27.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1500 tons, Washington state Snoqualmie Pass snowsheds, to Northwest Steel Rolling Mills, Inc., Seattle; general contract to C. V. Wilder Co. and Gaasland Co., Inc., Bellingham, Wash., low joint bid $1,015,621.

230 tons, Auburn, Wash., school, to Bethlehem Pacific Coast Steel Corp., Seattle; Carl Nilson & Son, general contract.

150 tons, four concrete state bridges, Douglas county, Washington, to Northwest Steel Rolling Mills, Inc., Seattle; C. E. Oneal, Ellensburg, general contract low $465,076.

125 tons, Bellingham, Wash., library, to Bethlehem Pacific Coast Steel Corp., Seattle; Harfst-Henson Co., Seattle, general contract.

11[illegible] tons, addition, hospital, Winchester, Mass., to Joseph T. Ryerson & Son, Inc., Cambridge; Daniel Cunningham Construction Co., Boston, general contractor.

REINFORCING BARS PENDING

4[illegible] tons, shops, warehouses, heating plant, Grand Coulee dam; plans by Bureau of Reclamation ready about Mar. 20.

250 tons, approaches Washington state Longview bridge; general contract to Guy F. Atkinson Co., Seattle.

210 tons, two state bridges over Boston & Maine and Boston & Albany railroads, Somerville-Boston; Westcott Construction Co., Attleboro, Mass., general contractor.

150 tons, veterans' memorial, Helena, Mont.; bids in.

100 tons, Washington state highway project, Grays Harbor county; bids to Olympia, Mar. 21.

100 tons, miscellaneous state highway projects; bids to Olympia Mar. 21.

Unstated, 10-story state office building, Portland; bids to State Board of Control, Apr. 3.

Unstated, 239-unit Northgate apartments, Seattle, $1,755,000 project; general contract to Howard S. Wright Co., Seattle.

PLATES . . .

PLATES PLACED

3500 tons, barge construction for John I. Hay Co., Chicago, to Chicago Bridge & Iron Co.

100 tons, elevated, 300,000-gal. water tank for Kennewick, Wash., to Chicago Bridge & Iron Co., Seattle.

100 tons, tanks for enlargement Hooker Electro-Chemical plant, Tacoma, to unstated fabricator.

PLATES PENDING

100 tons, oil terminal expansion, Seattle; bids in.

Unstated, cofferdam and unwatering equipment, Lucky Peak dam, Boise, Idaho; bids to U. S. engineer, Walla Walla, Wash., about Apr. 25.

A
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with Unexcelled Production Facilities

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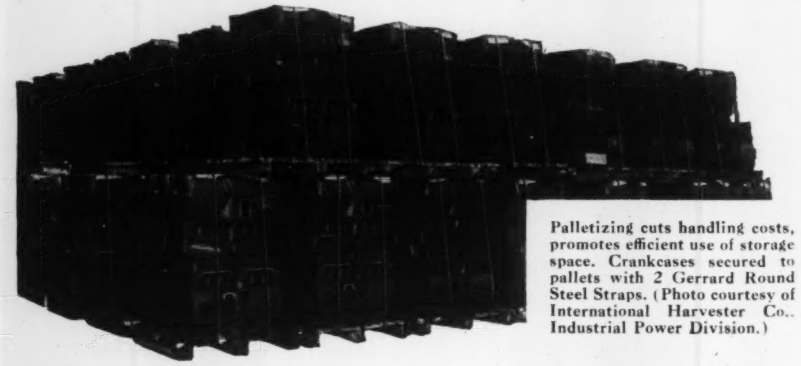

Palletizing cuts handling costs, promotes efficient use of storage space. Crankcases secured to pallets with 2 Gerrard Round Steel Straps. (Photo courtesy of International Harvester Co., Industrial Power Division.)

Tie it tight...that means GERRARD!

Tight as tight can be... that's the kind of tie you get when you use the Gerrard method of strapping. Gerrard Steel Strapping is *round* . . . that's why it clinches evenly at the corners and distributes the stress evenly through its diameter. Danger of breakage . . . and damage claims, too . . . are sharply reduced. Individual packages and palletized units remain firm from plant to destination.

Gerrard Machines and Strapping, in a wide range of sizes, can be used to tie small parcel post packages, heavy pallets or carload lots of steel pipe, plate and tinplate.

And Gerrard Round Steel Strapping costs about 40% less than any other metal reinforcement.

Write for a *free* copy of *Blue Book of Packaging*. And consult a Gerrard engineer about your packaging problems. His services are available free of charge.

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UNITED STATES STEEL

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APPROVED FOR LEADING MAKES OF PORTABLE TOOLS

NON-FLUID OIL is used and recommended by most leading makers of electric and air tools because prolonged service tests have proved to them that NON-FLUID OIL enables their tools to perform more efficiently over longer periods.

Remember, your new electric or air tools in all probability will come packed with NON-FLUID OIL, and the makers also recommend that you continue using it to keep tools in steady, trouble-free service—at lowest cost.

Send for sample of NON-FLUID OIL stating the portable tool in which it is to be used.

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NON-FLUID OIL is not the name of a general class of lubricants, but is a specific product of our manufacture.

PIPE . . .

CAST IRON PIPE PLACED

116 tons, 10 in. and smaller, University of Washington project, Seattle, to Hugh G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Erie, 7 diesel-electric locomotive units, two 1500-horsepower road-switching units and one 1000-horsepower yard-switching unit, to the Electro-Motive Division, General Motors Corp., LaGrange, Ill., and four 1500-horsepower road-switching units divided equally between Baldwin Locomotive Works, Eddystone, Pa., and the American Locomotive-General Electric Companies, Schenectady, N. Y.

LOCOMOTIVES PENDING

Chicago, Rock Island & Pacific, authorization for purchase of 20 diesels, 12 of which would be 1500-hp units, one a 2250-hp engine for passenger service, and seven 800-hp switchers.

RAILROAD CARS PLACED

Chicago & Northwestern, 3 rail diesel cars, to Budd Co., Philadelphia.

Chicago, Burlington & Quincy, 2700 freight cars, own shops, at Lincoln, Neb.; list comprises 1900 fifty-ton box cars, 600 seventy-ton triple hopper cars and 200 seventy-ton hopper cars.

Lehigh Valley, 100 seventy-ton covered hopper cars, to Bethlehem Steel Co., and 50 seventy-ton flat cars to its Packerton, Pa., shops.

Minneapolis, St. Paul & Sault Ste. Marie, 75 seventy-ton hopper cars, to its own shops.

Missouri Pacific, 100 seventy-ton hopper cars, to its own shops.

Missouri-Kansas-Texas, 500 fifty-ton box cars, to American Car & Foundry Co., New York.

Norfolk & Western, 1000 seventy-ton steel hopper cars, to its Portsmouth, O., shops.

Northern Pacific, 500 fifty-ton box cars, and 50 caboose cars, to its own shops.

Western Fruit Express Co., 50 refrigerator cars, to its own shops.

Wilson Car Lines, 100 refrigerator cars, to its own shops.

RAILS PENDING

Alaska Railroad, 45,700 tons, 115-lb., also 10,000 tons tie plates and miscellaneous items; bids to General Services Administration, Anchorage, Alaska, Mar. 20. First delivery 5000 tons May 1, same June and July 1; final delivery Apr. 1, 1951.

FERROALLOYS

(*Continued from Page* 127)

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8MxD, bulk, 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 20.50c per lb of contained chromium plus 11.30c per pound of contained silicon; 1" x down, bulk, 20.65c per pound of contained chromium plus 11.50c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max 0.50%

C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

Silicon Alloys

25-30% Ferrosilicon: Contract, carload, lump, bulk, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.
75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15.00c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.
90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l. lump, bulk, regular 19.0c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.65c per lb of alloy, ton lots packed 9.05c, 200 to 1999 lb 9.40c, smaller lots 9.90c. Delivered. Spot up 0.5c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3⅝ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.
(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%.) Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot, add 0.25c.

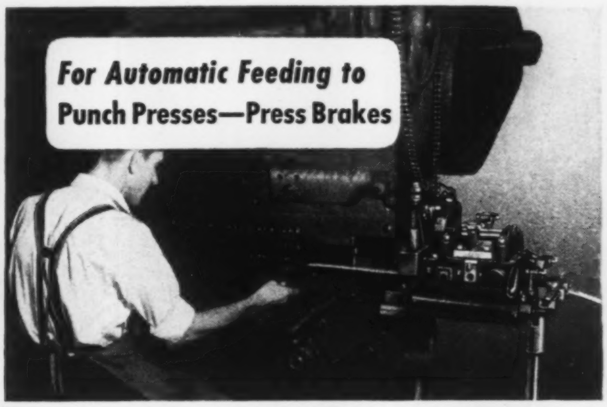
Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

Titanium Alloys

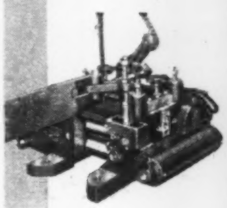
Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

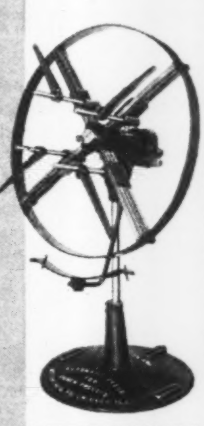
Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C



A press brake equipped with Wittek No. 6-L Automatic Roll Feed





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Wittek Roll Feeds are made in standard models to meet every requirement in the automatic feeding of strip stock to punch presses or press brakes. The distinguishing feature is their simple and economical method of operation which does away with complicated parts thereby assuring *speed* and *accuracy* in the feeding of various kinds and thicknesses of material.

Wittek Adjustable Reel Stands are designed as companion units to Wittek Automatic Roll Feeds and are available in seven different models to handle *ALL* types of coiled strip stock and wire being fed to punch presses or similar production machinery.

Special units of Wittek Automatic Roll Feeds and Adjustable Reel Stands are engineered to meet unusual requirements.

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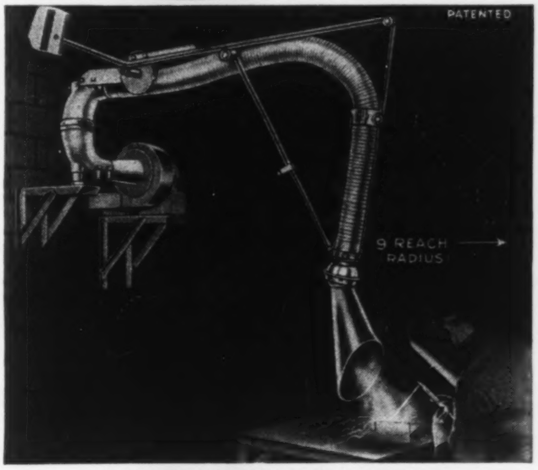
Automatic
ROLL FEEDS
AND
REEL STANDS

WMCo

"It certainly is a relief to have fumes and heat removed while I'm welding. The Ruemelin Collector has great suction. It makes a day's work pleasanter!"



Ruemelin Fume Collector in operation.

Welding shops equipped with Ruemelin Fume Collectors are assured of a clean shop atmosphere. Noxious fumes, heat and smoke are eliminated at their source, thus improving working conditions, lessening fatigue and paving the way for increased plant production.

The Ruemelin Fume Collector hood can be instantly placed where needed anywhere in the booth welding area. No tedious adjustments necessary. Just pull the inlet hood to the welding position and you are ready to go. Approved by state industrial commissions and by compensation insurance companies. Simple to install. Thousands in service. Many users send in repeat orders. Write for bulletin 37-D today.

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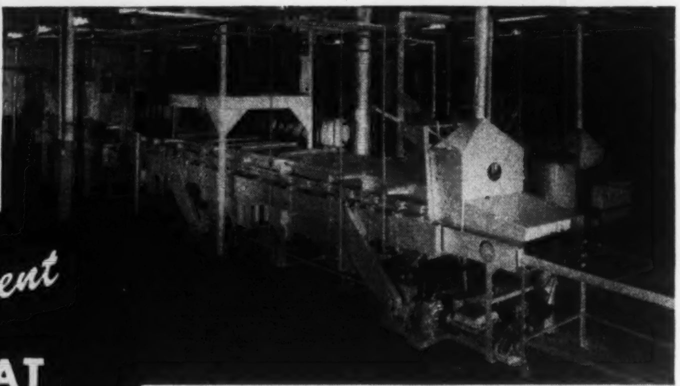

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Our wide experience, and complete line of production furnaces enables us to meet any requirement for ferrous and non-ferrous metal powder processing, fusing metal powders on strip and all other heating and heat treating operations.

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For Greater PRODUCTION EFFICIENCY SAVINGS

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3-4.5%.) Contract, $175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

Vanadium Alloys

Ferrovanadium: Open-Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.) Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.) $3.10.

Grainal: Vanadium Grainal No. 1, 93c; No. 6 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots, $1.20 per lb contained V_2O_5, freight allowed. Spot, add 5c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

Zirconium Alloys

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconinum Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract carload, lump, packed 20.25c per lb of alloy ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c F.o.b. Washington, Pa.., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 50-60%, Si 8% max., C 0.5% max.). Contract, ton lot, 2" x D, $3.50 per lb of contained Cb, less ton $3.55. Delivered. Spot, add 10c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Carload, 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.50c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.00c per lb of alloy; ton lots 18.00c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

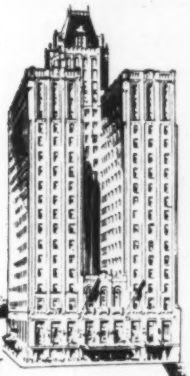
V-5 Foundry Alloy: Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.25c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. seller's works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.13.

Technical Molybdic-Oxide: Per lb, contained Mo., f.o.b. Langeloth and Washington, Pa., packed in bags containing 20 lb of molybdenum, 95.00c.



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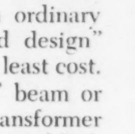

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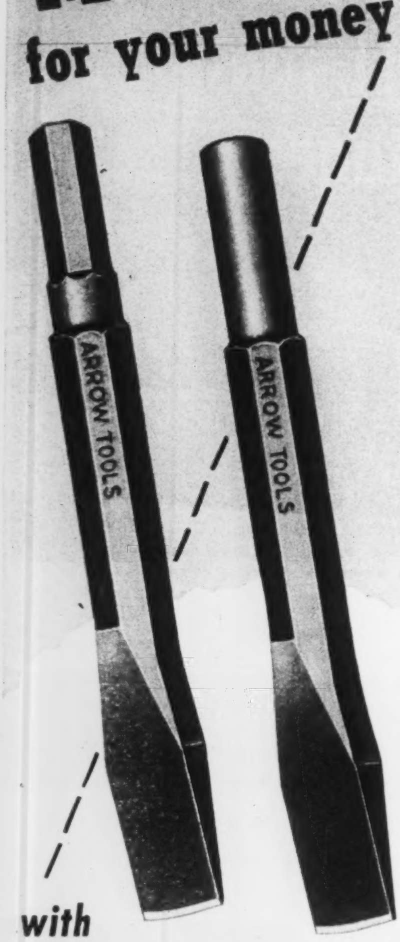

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Metalworking Briefs

CONSTRUCTION, ENTERPRISE ORGANIZATIONAL CHANGES

A new building expansion program for **Rochester Products,** carburetor division of General Motors Corp., Rochester, N. Y., was announced by Thomas L. Lee, general manager. A new building, 400 x 680 feet, will be added, increasing production space about 60 per cent.

Niagara Mohawk Power Corp. will spend $65 million in 1950-51 for construction to provide for increased requirements of customers and for further growth and reserve capacity.

General Electric Co. at Electronics Park, Syracuse, N. Y., is hiring several hundred more employees each week as a result of an ever mounting demand for television receivers. Employment now approaches 8000—3000 more than the forecast maximum for the plant when it was built.

Union Special Machinery Co., Huntley, Ill., awarded a contract to Campbell-Lowrie & Lautermilch, Chicago, for construction of a one-story brick and concrete addition, containing about 16,000 sq ft of floor space. Cost is to be about $100,000.

Hubbell Valve Co., Chicago, awarded a contract to Northern Builders Inc., same city, for construction of a one-story brick, concrete and steel factory building to contain about 12,000 sq ft of space. It will cost upwards of $68,000.

Maytag Co., Newton, Iowa, awarded contracts for erection of two plant additions to Arthur H. Neumann & Bros. Inc., Des Moines, Iowa. One building, to measure 300 x 300 feet, will house a factory to produce automatic electric clothes dryers; the other building 100 x 700 feet, is to be a warehouse addition. The improvements will cost about $600,000.

Northrop Aircraft Inc., Hawthorne, Calif., established a separate special weapons department to conduct research and development projects outside the field of manned military aircraft, John K. Northrop, president, announces. S. E. Weaver, veteran Northrop engineer, will head the new department.

Twin Coach Co. is considering consolidation of the company's bus manufacturing operations in Buffalo. It would mean shifting of some production activity from Kent, O., to Buffalo.

Bell Aircraft Corp., Buffalo, announced the sale of the business of its Prime Mover Division to a newly organized concern at Muscatine, Iowa. The move was made so Bell could devote all its activities to pressing military orders. The Prime Mover is a 400 pound wheelbarrow, equipped with three wheels and a small motor.

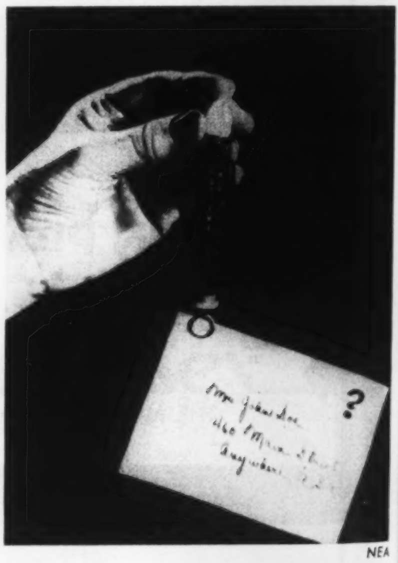
Plans were announced for construction of a $20 million soda ash plant at **Solvay Process Division** of Allied Chemical & Dye Corp. near Syracuse, N. Y.

G. D. Peters & Co. of Canada Ltd., subsidiary of Air Reduction Co. Inc., New York, changed its name to **Air Reduction Canada Ltd.**

American Machine & Metals Inc., New York, established a new division through acquisition of Gotham Instrument Co. Inc., New York. The acquisition will supplement the line of pressure, temperature, electrical, flow and liquid-level indicating instruments made by the United States Gauge Division, by the addition of a complete line of industrial recording and controlling instruments made by the Gotham Instruments Division.

Vonnegut Moulder Corp., Indianapolis, purchased the patents, sales and manufacturing rights for the Newton swing belt grinder from Newton Mfg. Co., Temple, Tex.

Nook & O'Neill Inc., 10028 Carnegie Ave., Cleveland, is the new northwestern Ohio distributor for the Automatic Transportation Co., Chicago manufacturer of electric industrial trucks. Robert M. Slife is president of the Cleveland concern.



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ARE YOU A POSTAGE GUESSER?: Guessing at postal rates is costing the American public thousands of dollars each year. A businessman who got tired of the guesswork in letter weights developed this little gadget, Postomatic. It weighs letters accurately up to four ounces and gives the correct rate of postage. Postomatic Co., Philadelphia 40, makes the featherweight scale

Gibson Electric Co., Pittsburgh, announces an increase of 50 per cent in the production capacity of the company's powder metallurgy department. Increased capacity was a result of installation of a sintering fur-

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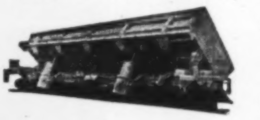

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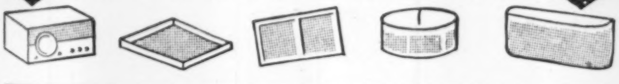

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